August 18, 2004

How to Employ Risk Management at a Major Air Carrier

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Overview

- Integrating the FAA System Safety Process into our Risk Management Process
- Review of FAA System Safety Process
- Voluntary Safety Programs (Flight Safety)

Question:

How can voluntary safety programs be integrated into the FAA's System Safety Process to reduce operation risk?

FAA Risk Management Guidance

- Part 121 Air Carrier Safety Departments, Programs (HBAT 99-19, HBAW 99-16)
- Necessary safety program elements include:
  - Operational Risk Assessment Program
  - Routine Monitoring and Trend Analysis Program

FAA Risk Management Guidance

"Each air carrier should have a safety department that *addresses the broad range of risks* involved in commercial aviation to include, but not limited to, flight, maintenance, and ground safety."

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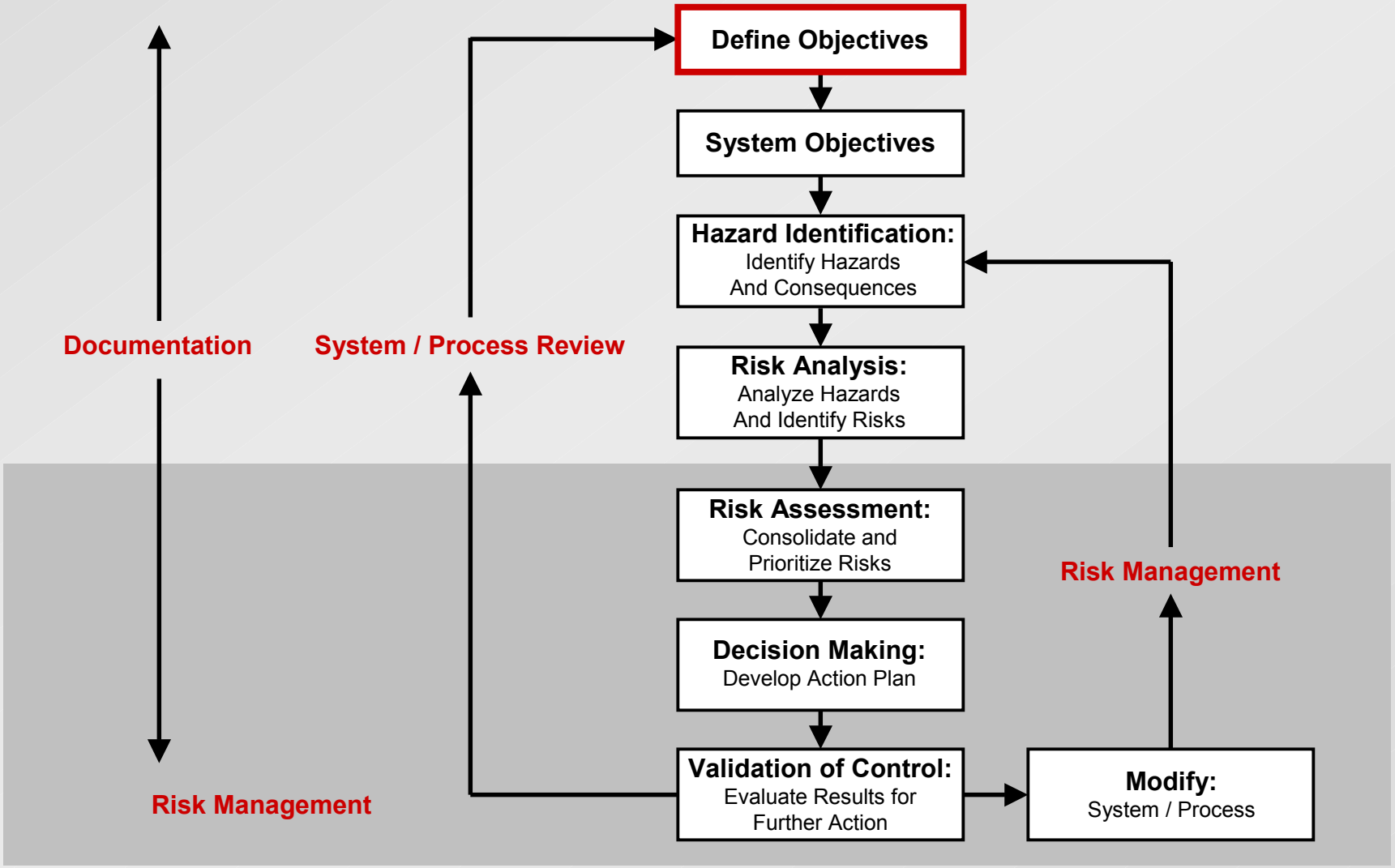
FAA System Safety Process



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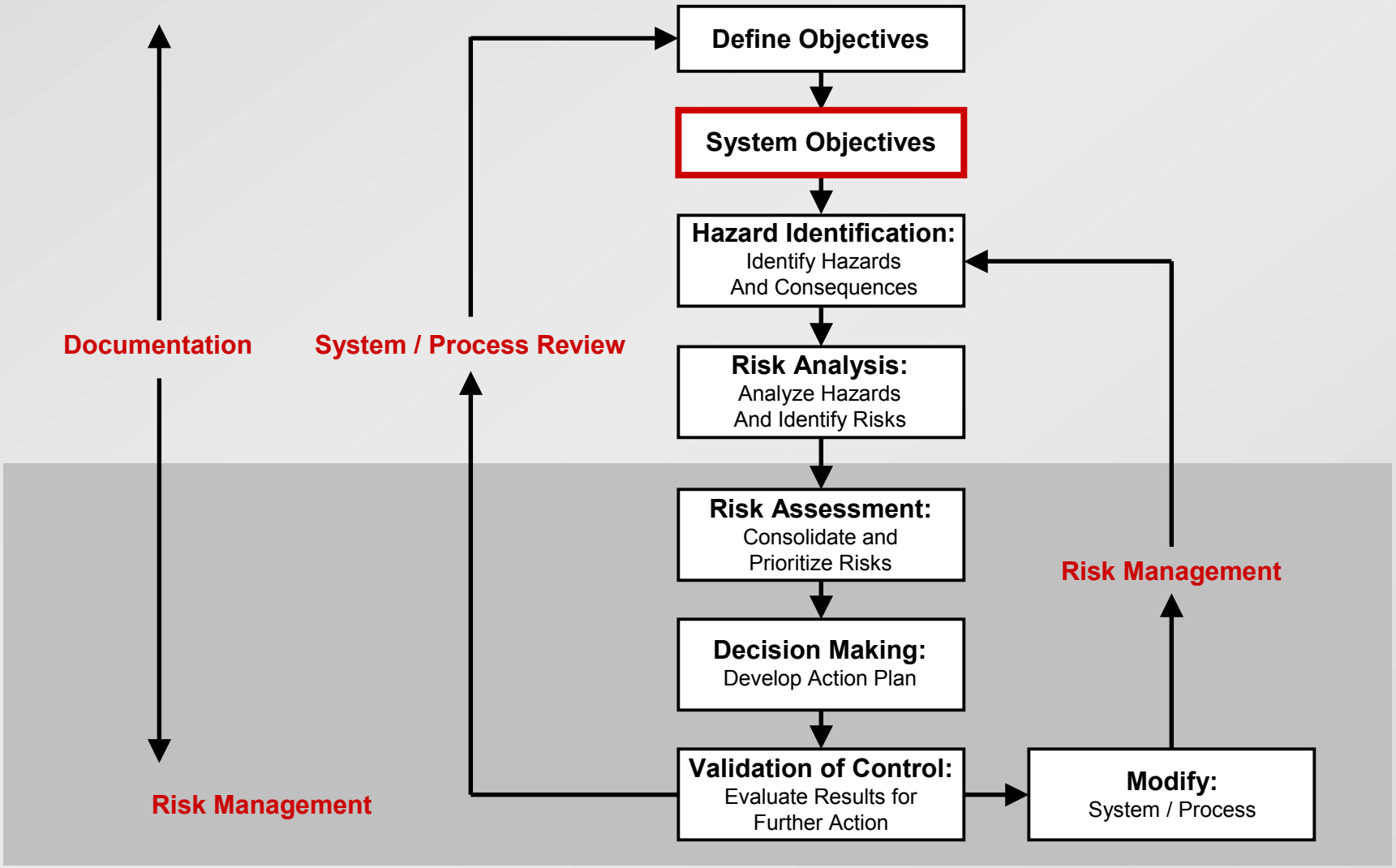

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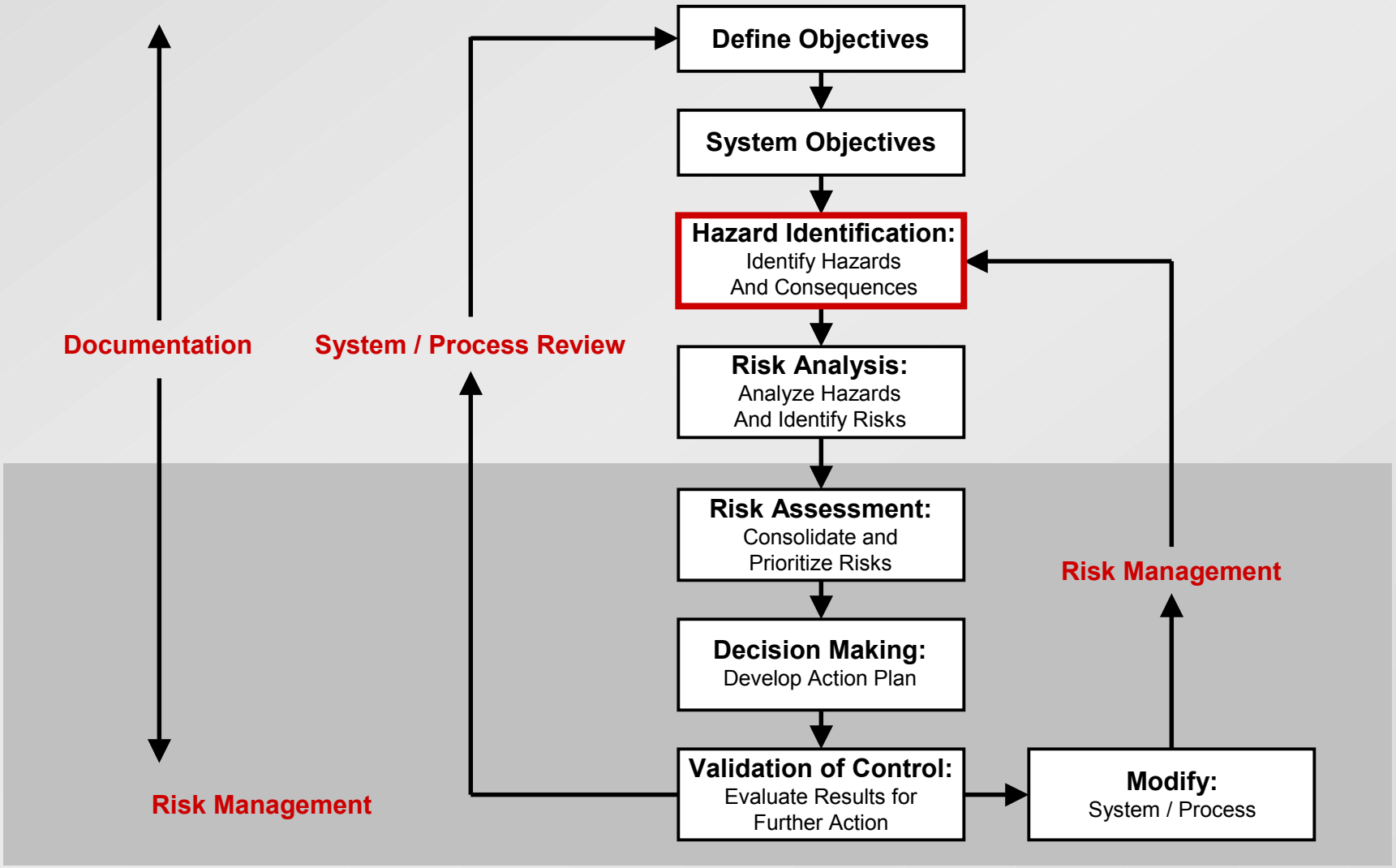

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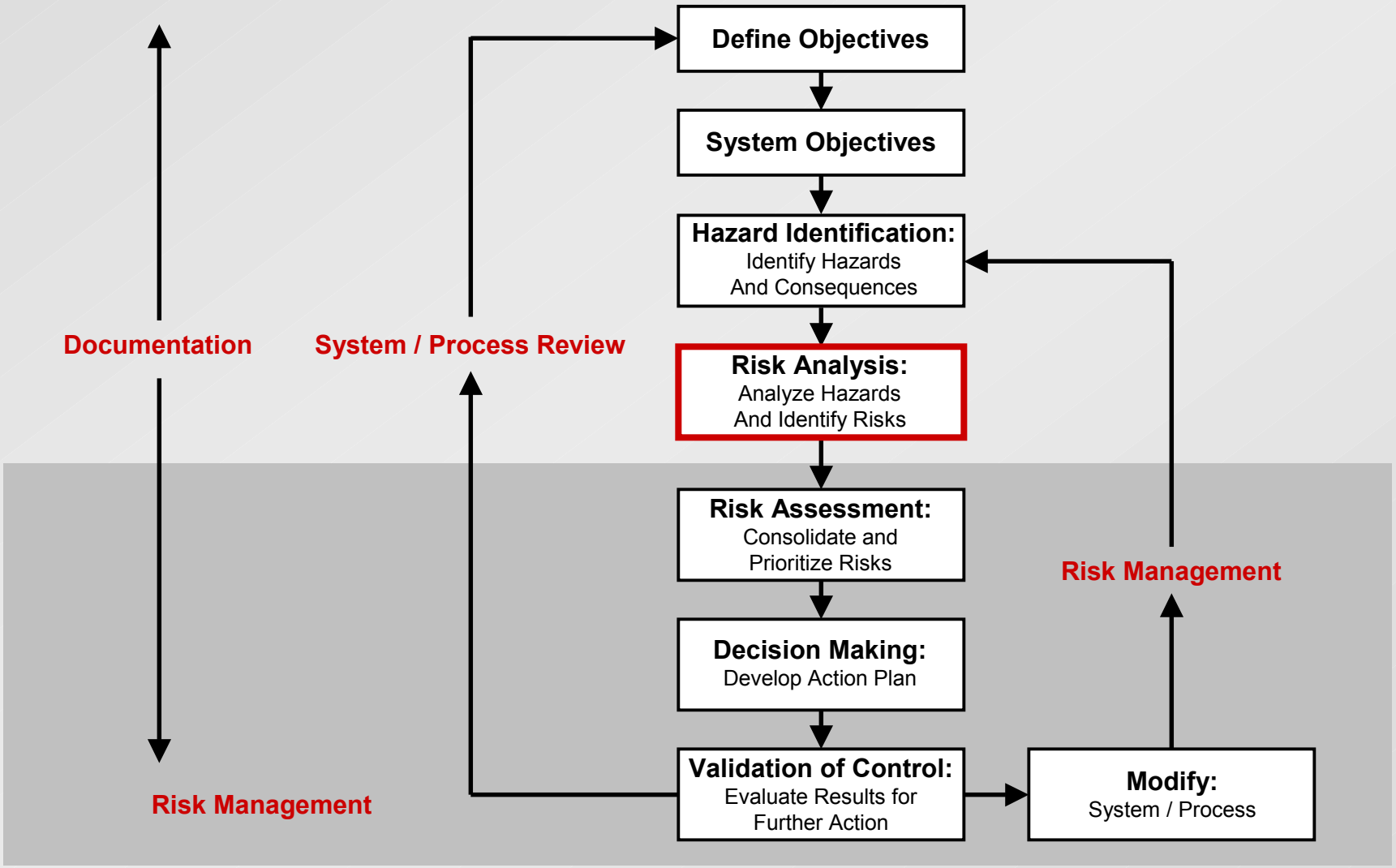

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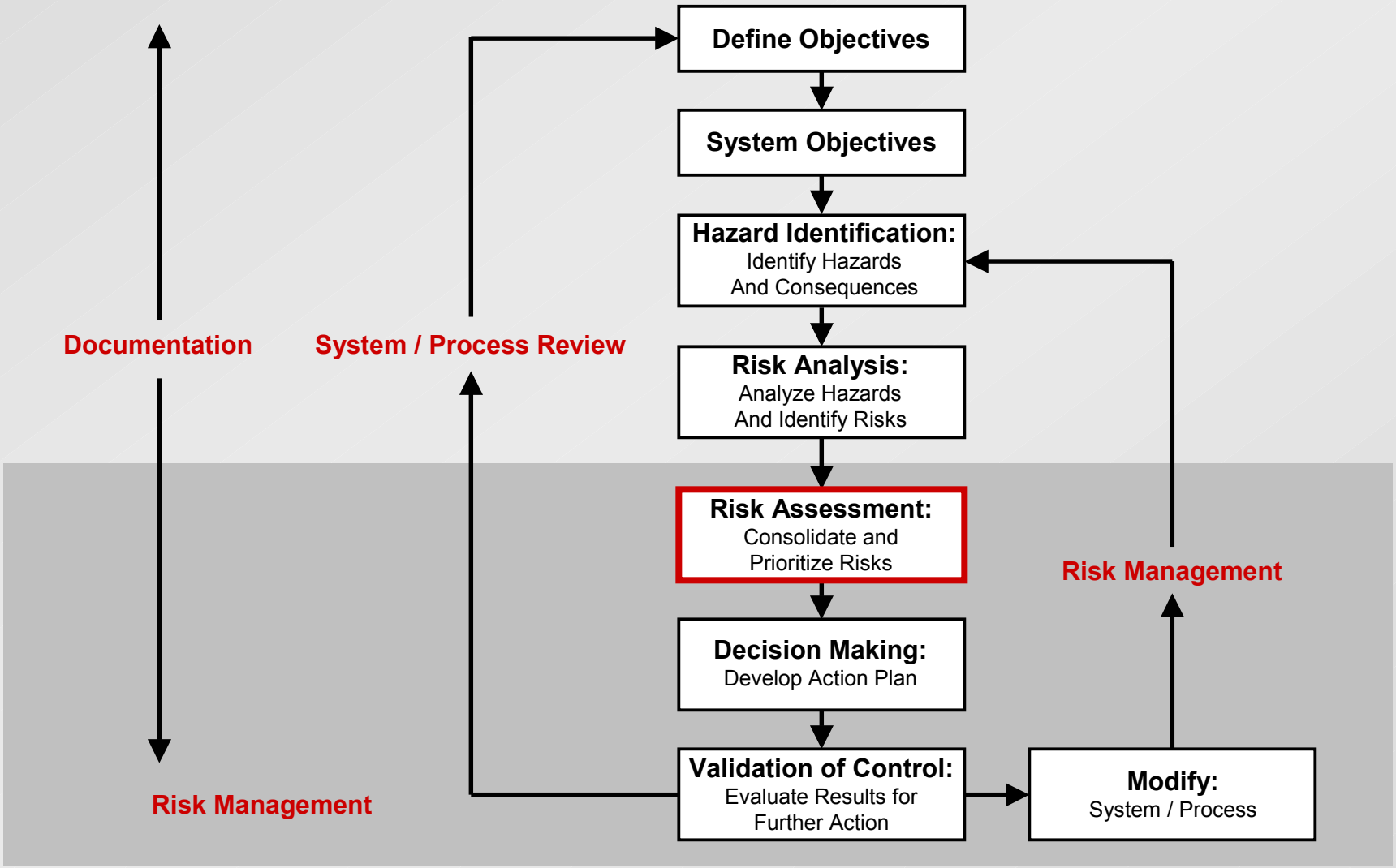

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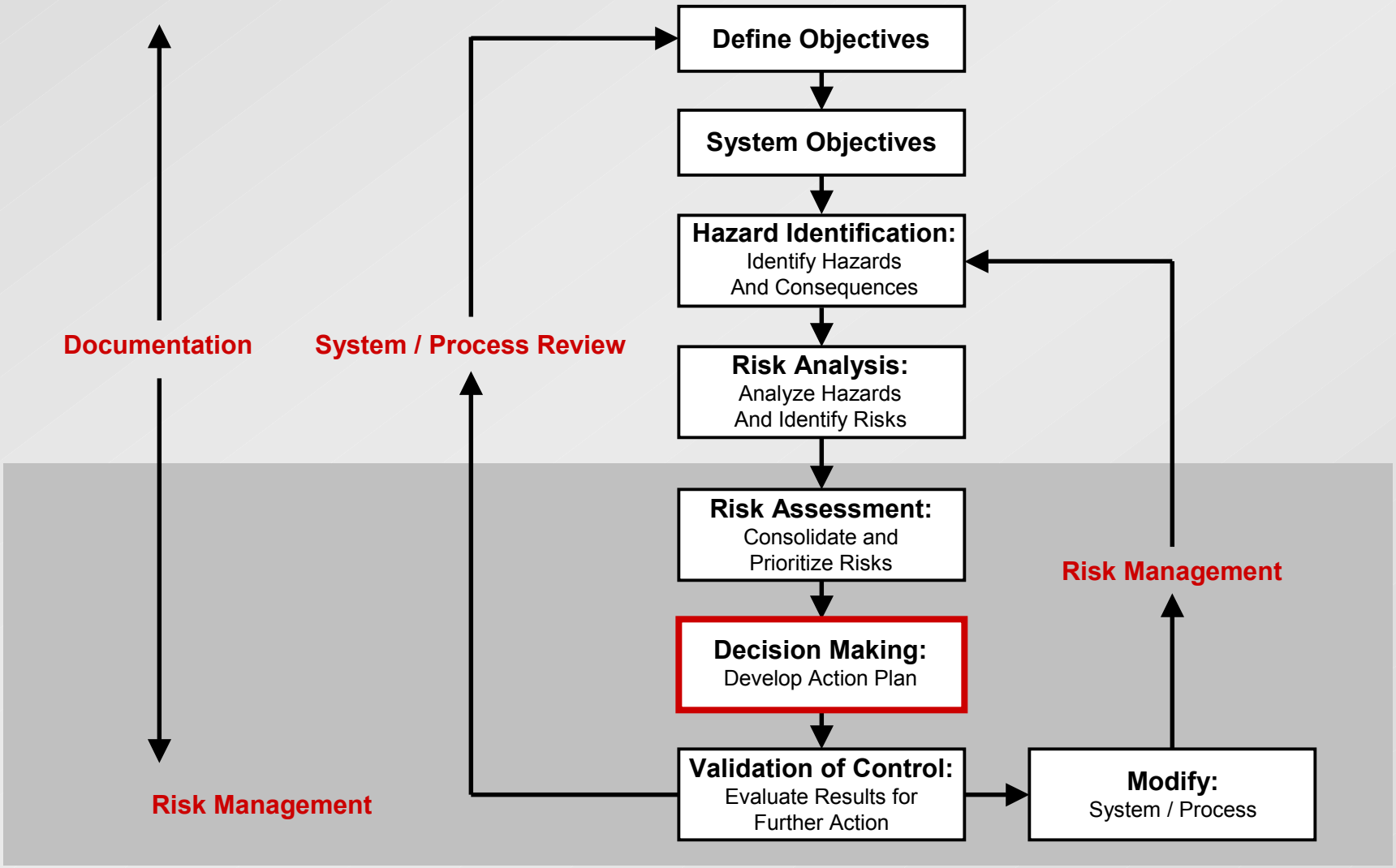

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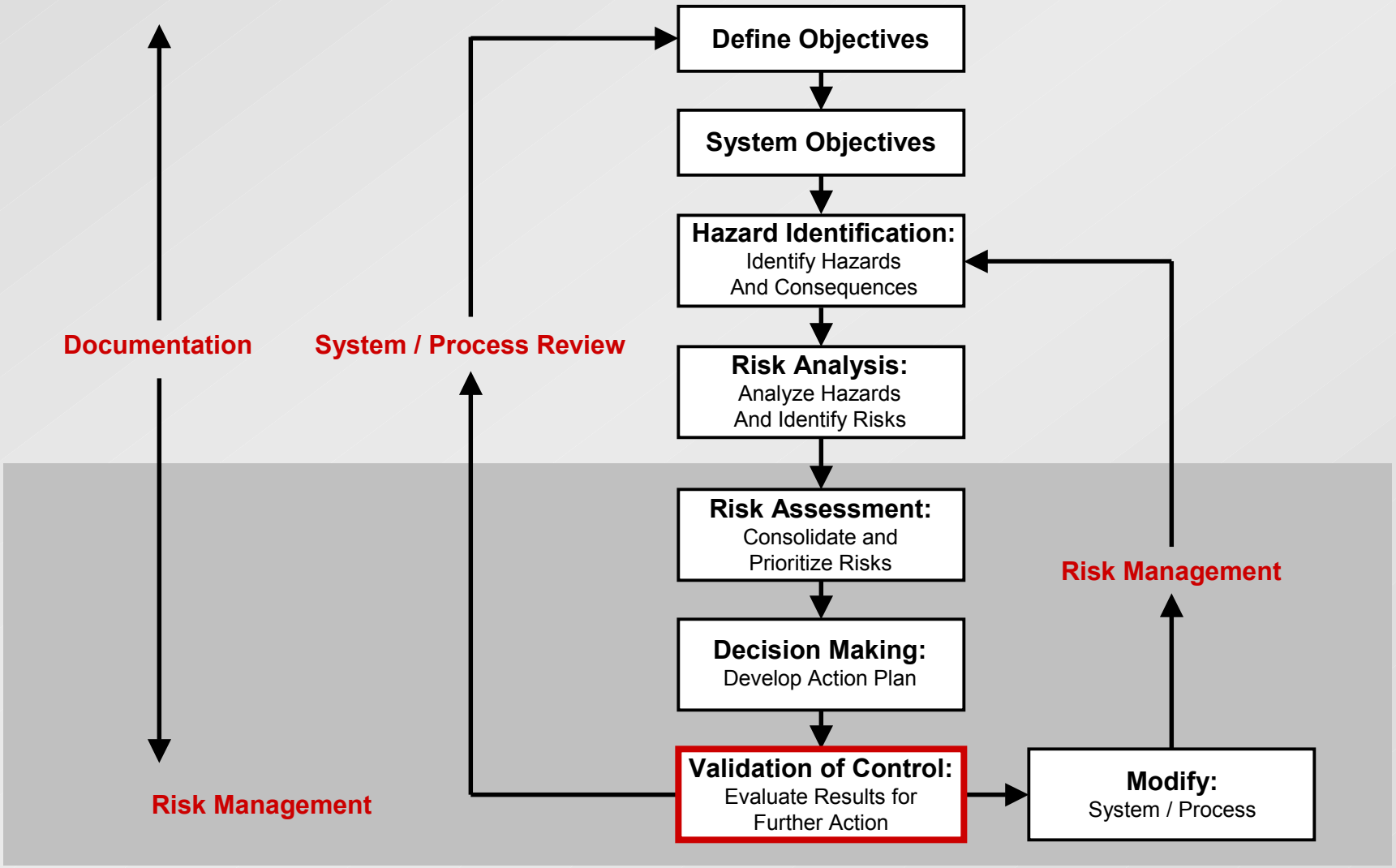

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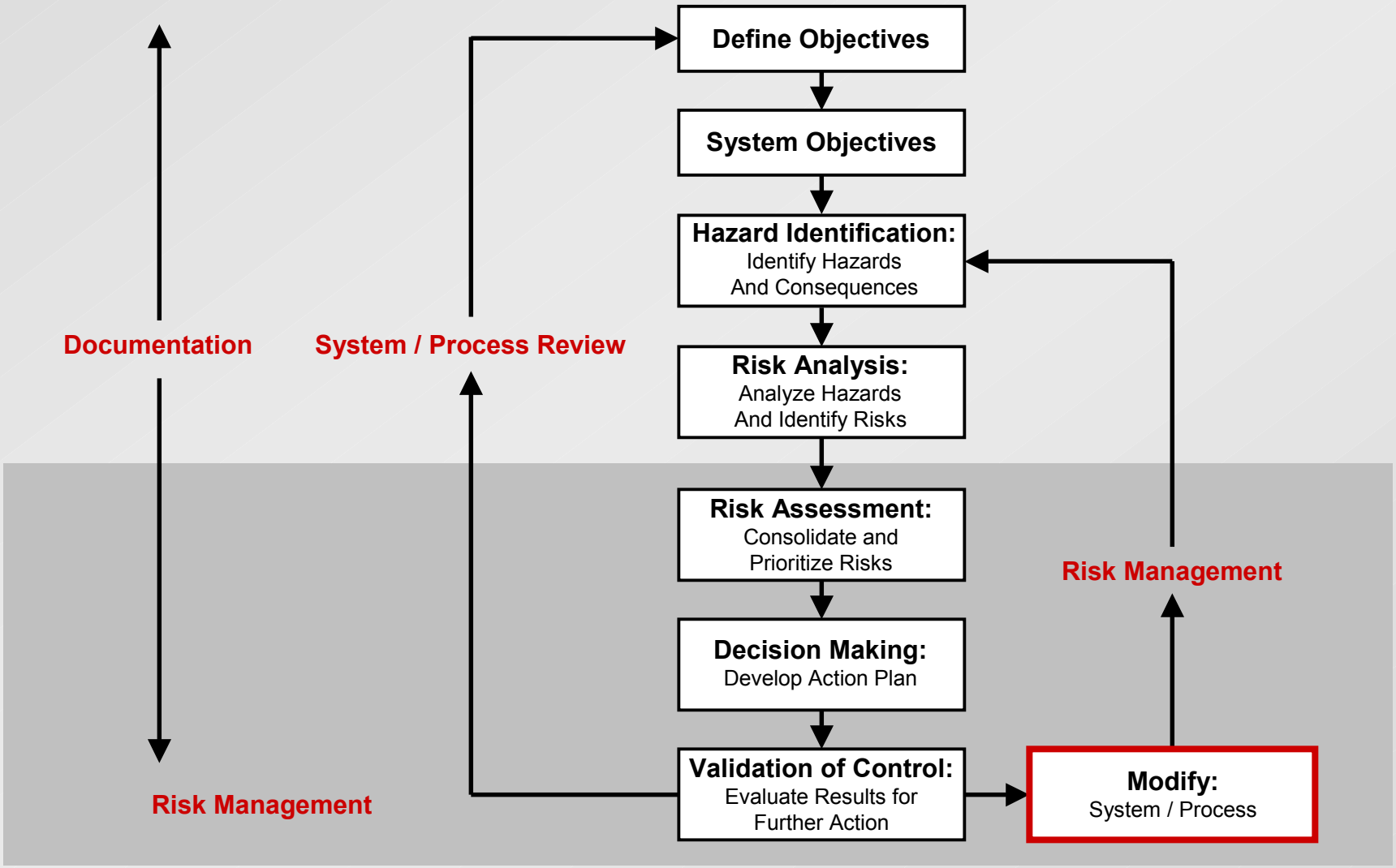

Voluntary Safety Programs

- Approved under the auspices of the FAA Flight Standards Office: (AFS-230)
- Designed to reduce operational risk through constant evaluation of operations and improvement of procedures and training

Voluntary Safety Program Definitions

- ASAP: Aviation Safety Action Program
  - Pilot reports on operational errors, or operational hazards
- FOQA: Flight Operations Quality Assurance
  - Digital data from an onboard recorder generated during normal operations
  - Aggregated data and automated processing allows for safety trend analysis and identification of otherwise unknown safety issues
- AQP: Advanced Qualification Training program
  - Proficiency based pilot training
  - Integrates training and evaluation
  - Data collection provides feedback to revise program

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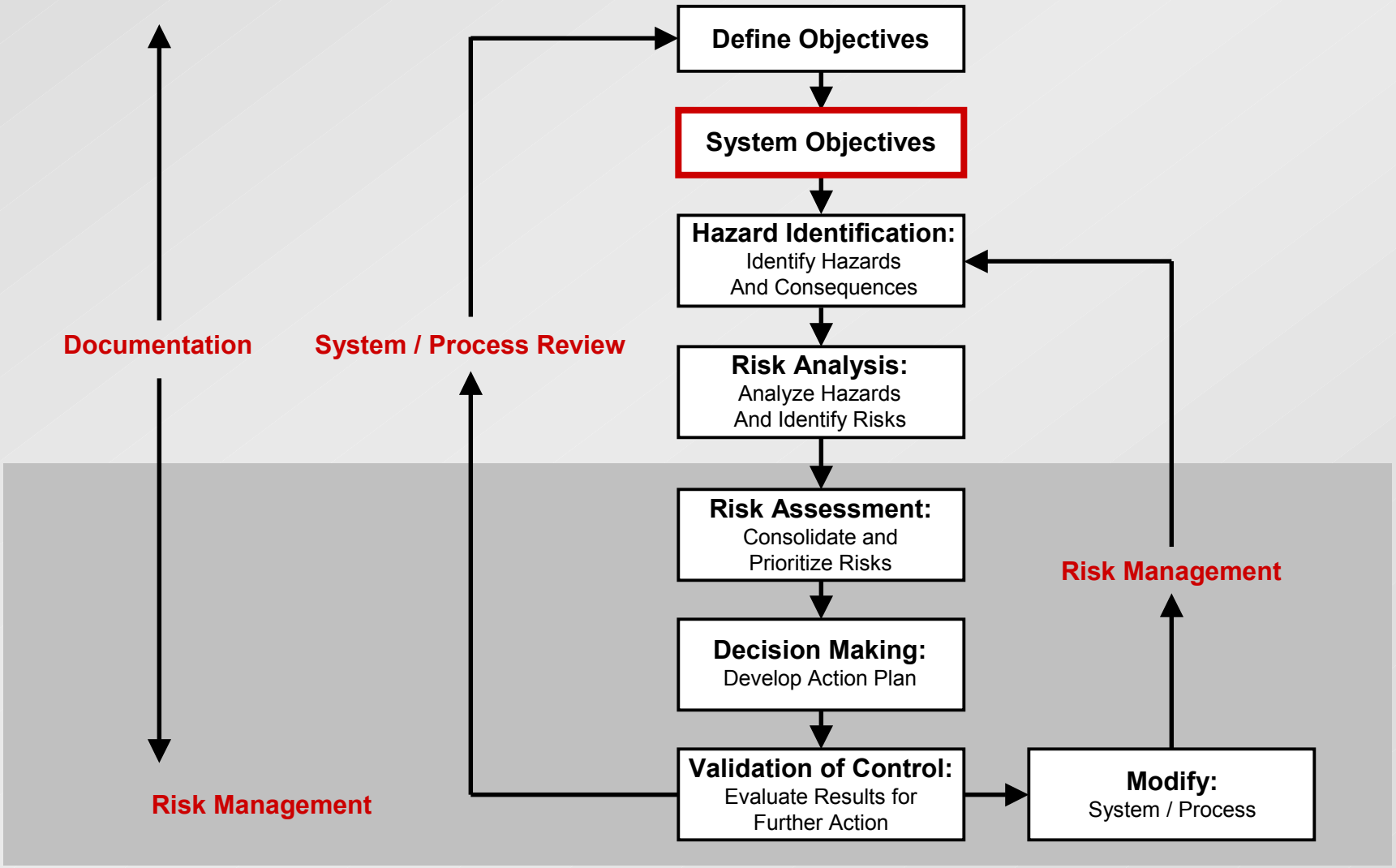

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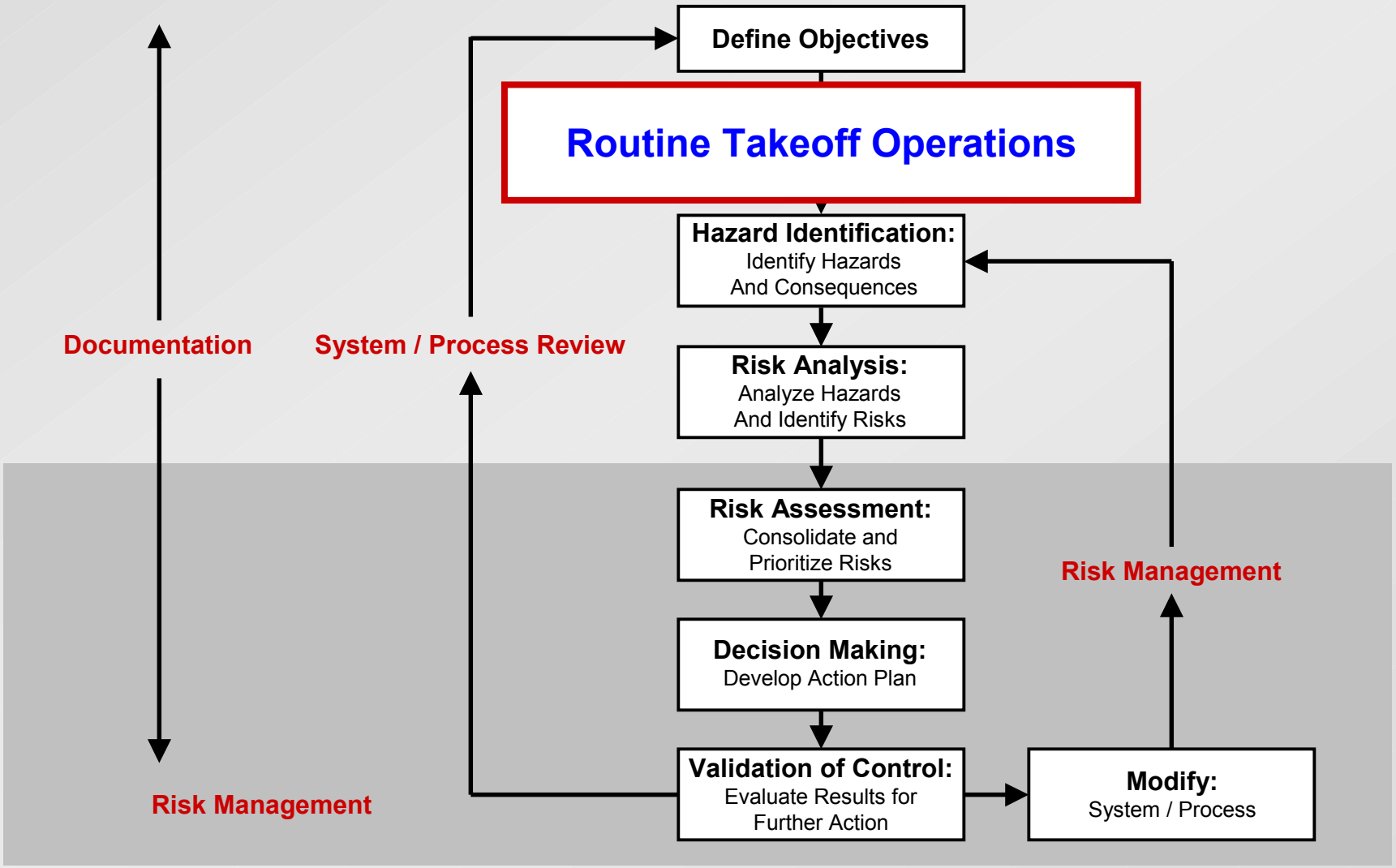

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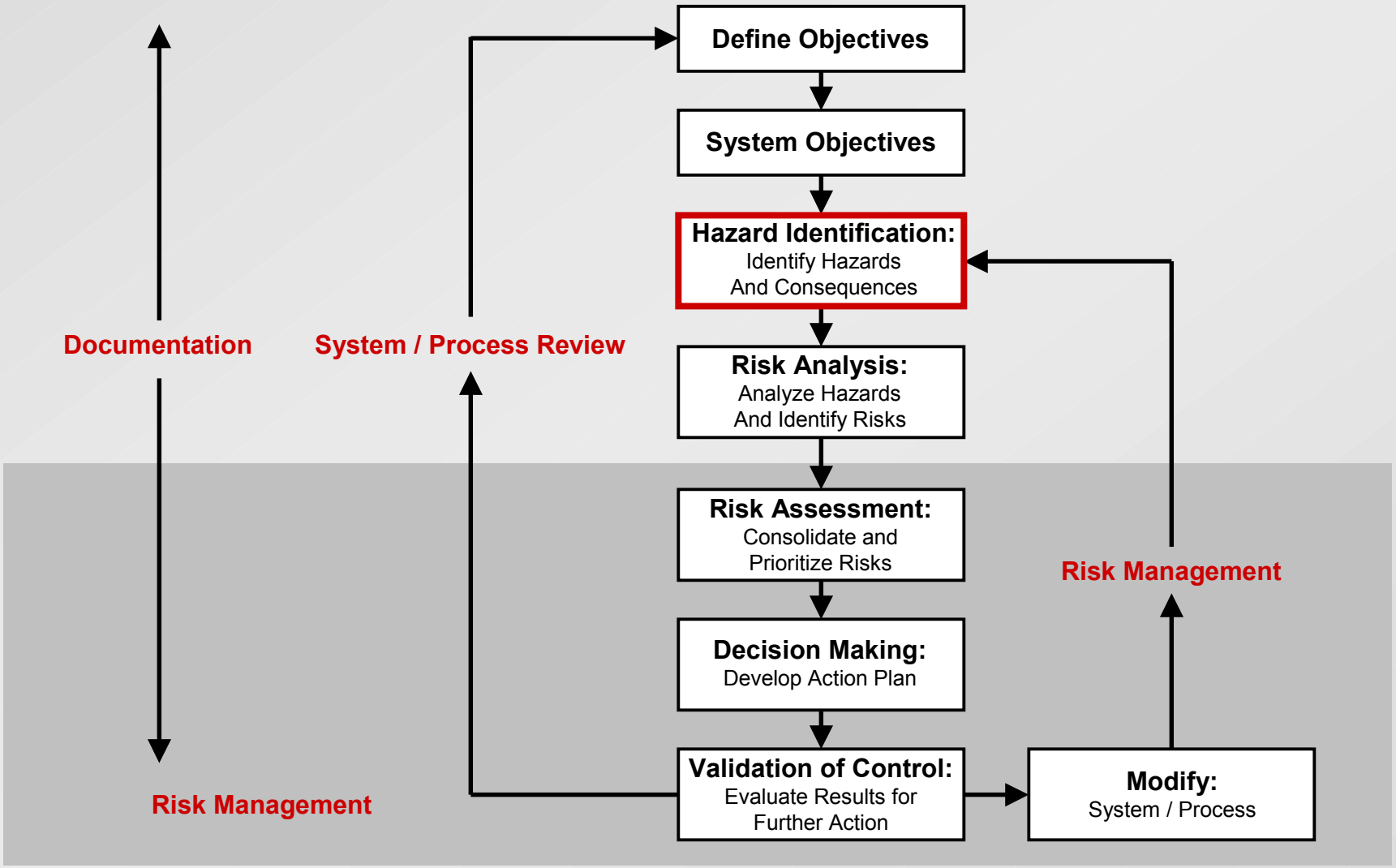

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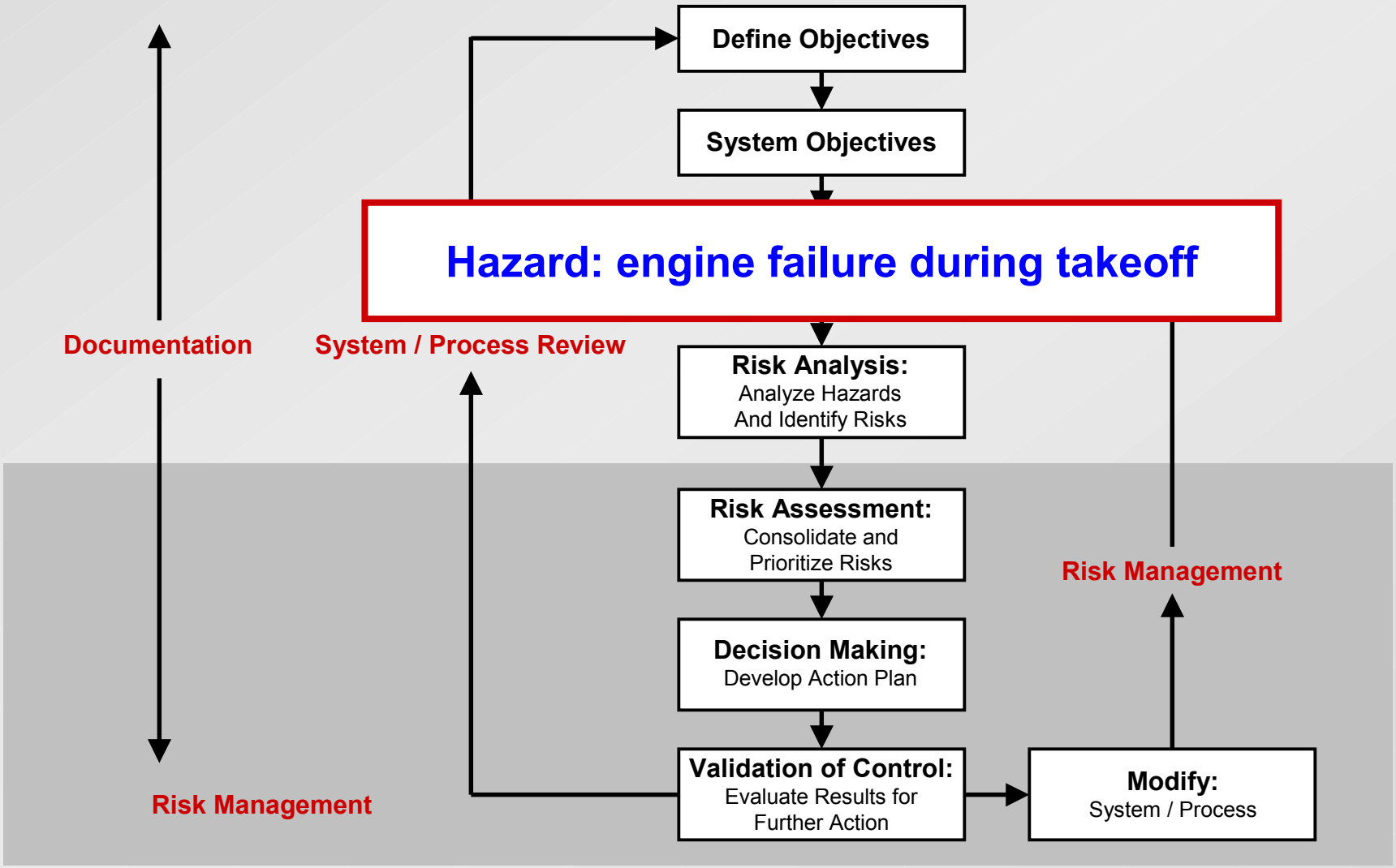

Engine Failure Consequences

- None (low speed abort)
- Hot brakes/blown tires/minor runway excursion (medium speed abort)
- Aircraft damage/passenger injuries (high speed, runway excursion)


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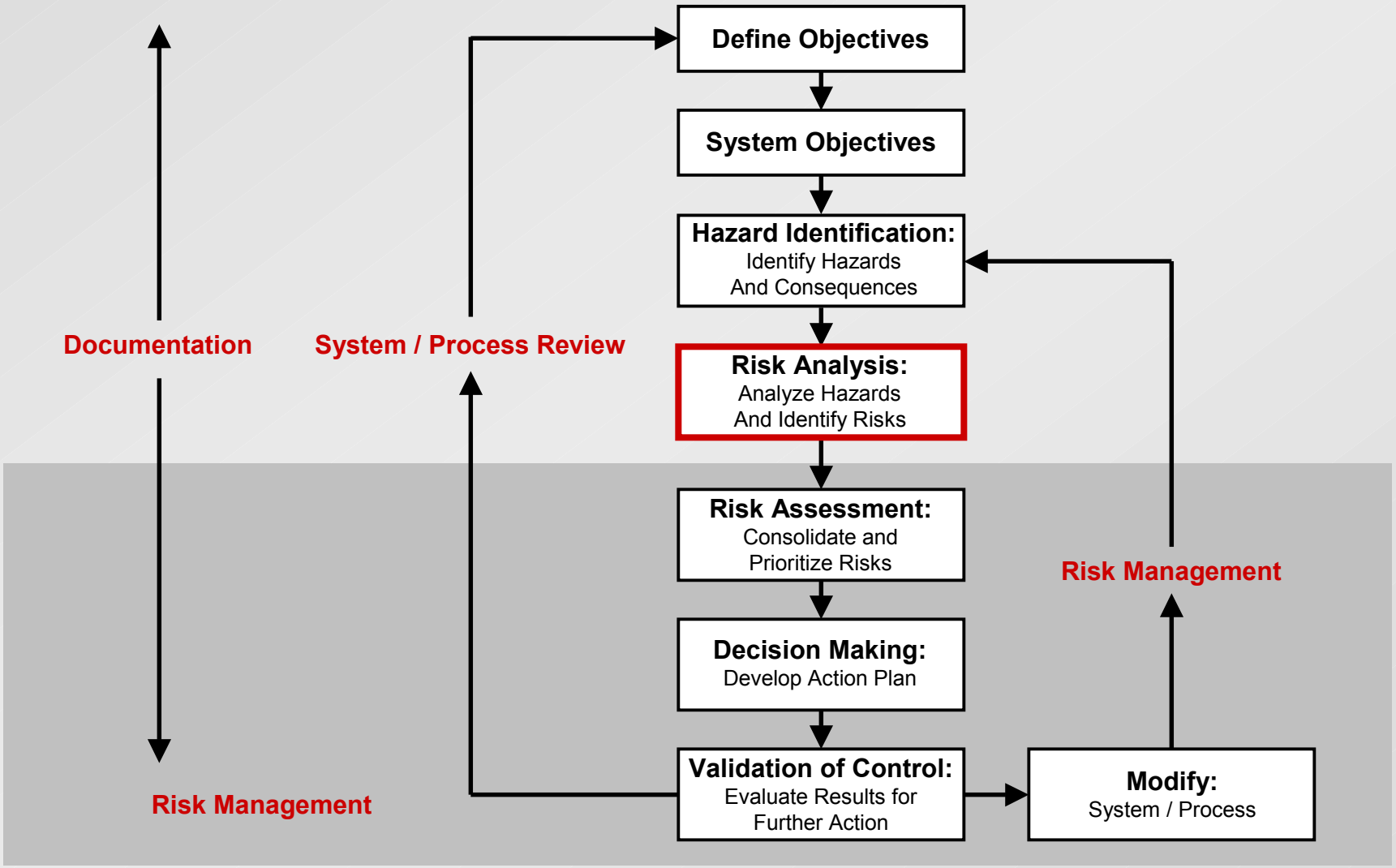
Engine Failure Consequences

- Air turn back (successful engine out takeoff and return for landing)

FAA System Safety Process



Identify All Operational Risks

Sources:

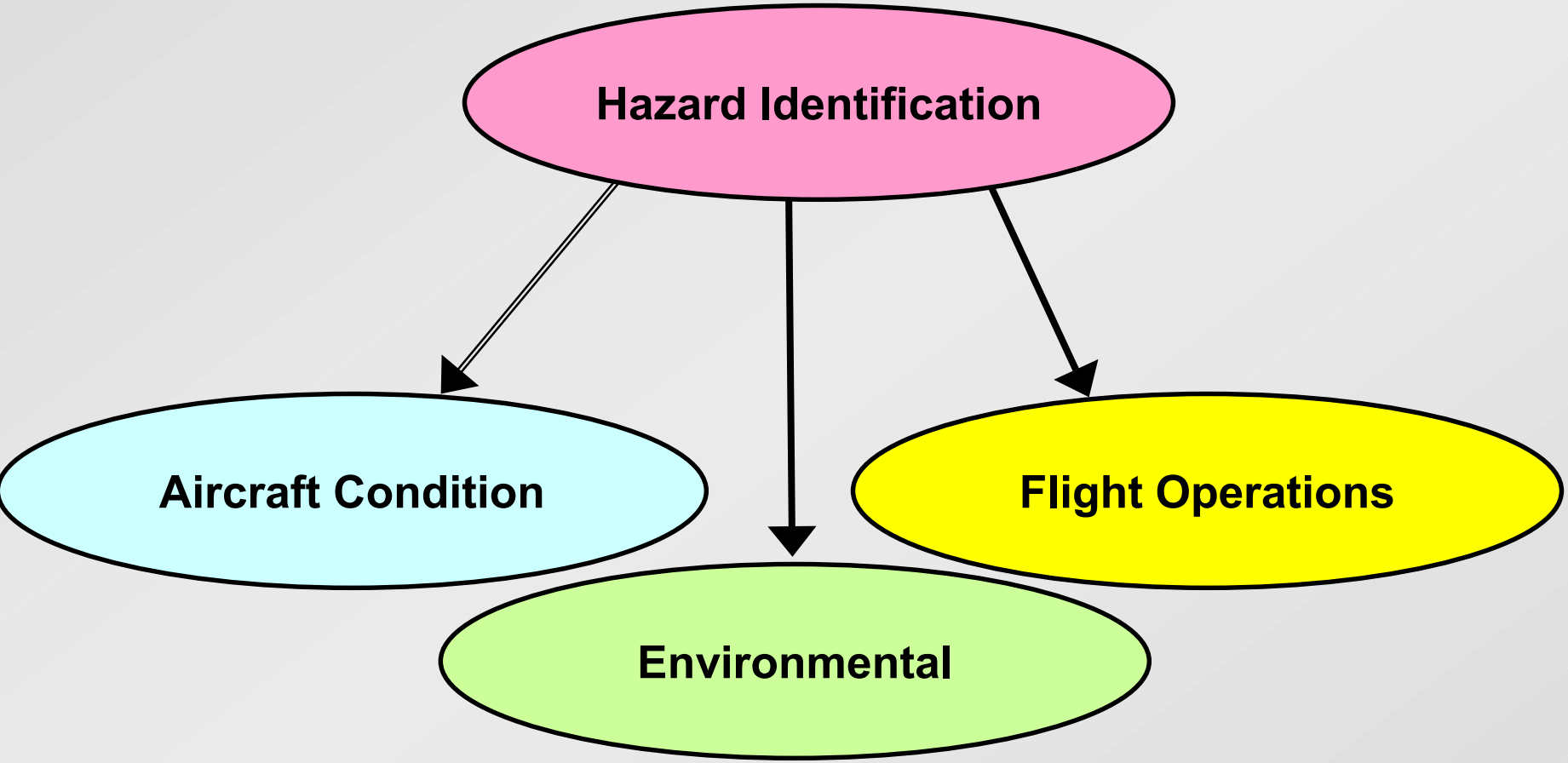
Internal

- ASAP reports
- FOQA data

Industry data:

- NTSB web site (www.ntsb.gov)
- Flight Safety Foundation (http://flightsafety.org)
- FAA Accident/Incident Data System (https://www.nasdac.faa.gov)

Engine Failure During Takeoff Risk Analysis



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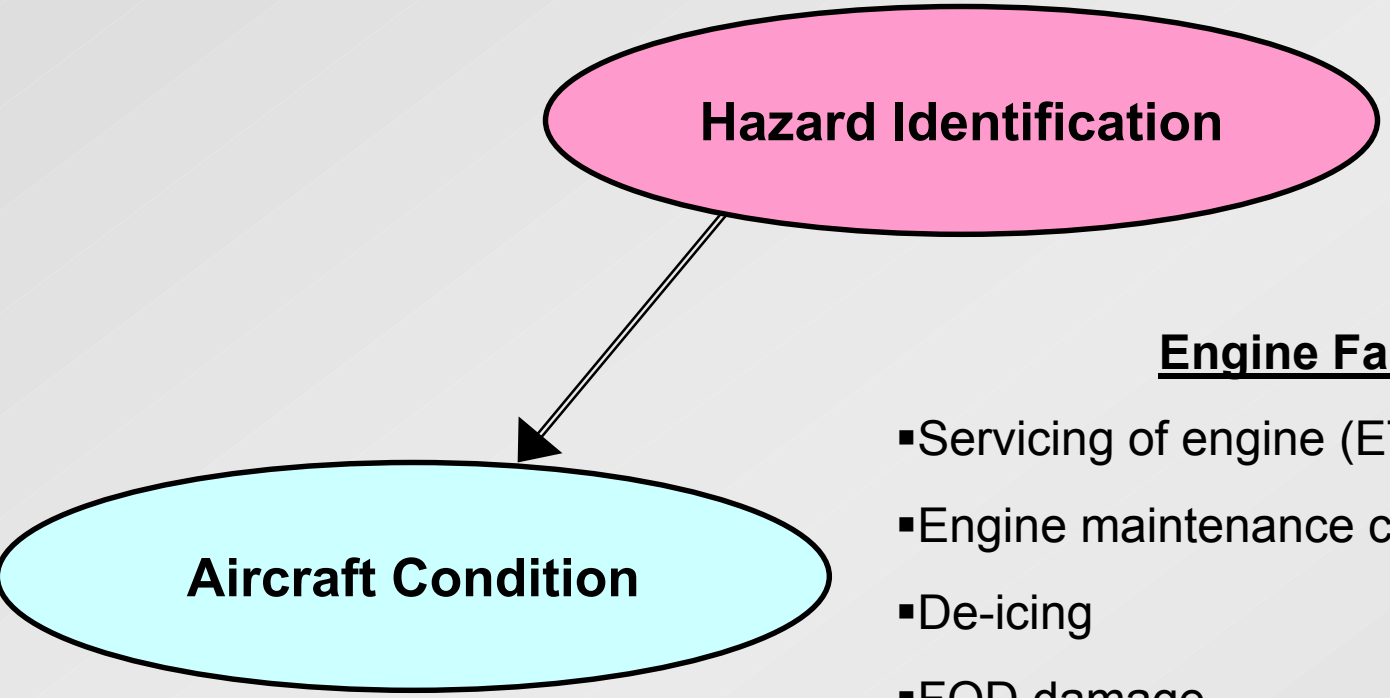
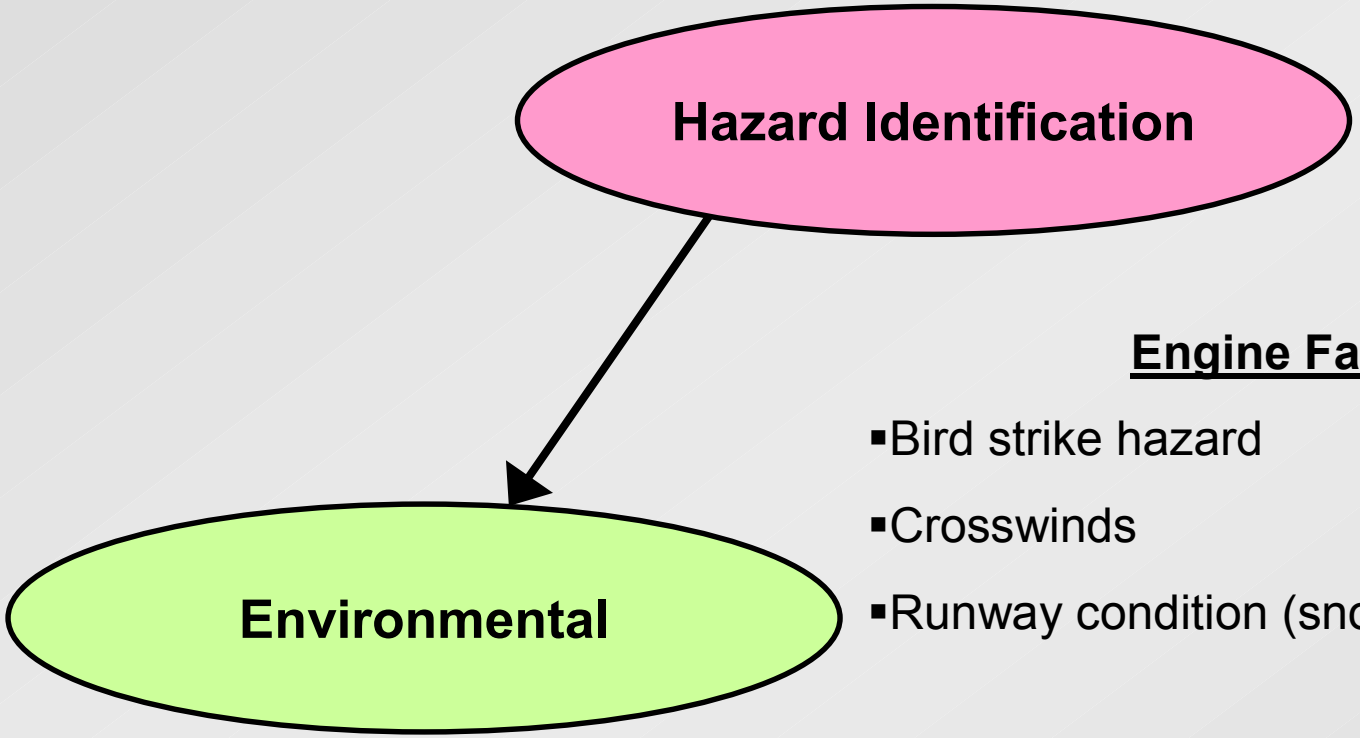


Engine Fail Risks

- Servicing of engine (ETOPS, non-ETOPS)
- Engine maintenance condition
- De-icing
- FOD damage
- Weight and thrust rating
- Aircraft selection for route

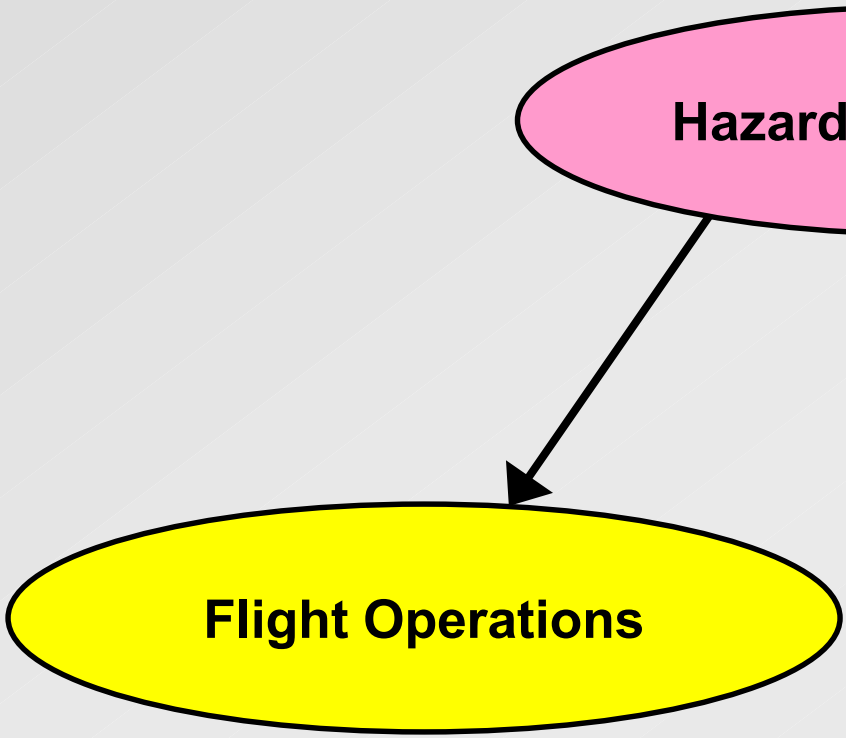
Engine Failure During Takeoff Risk Analysis



Engine Fail Risks

- Bird strike hazard
- Crosswinds
- Runway condition (snow or ice contamination)
- Runway selection (winds, length, obstacles)

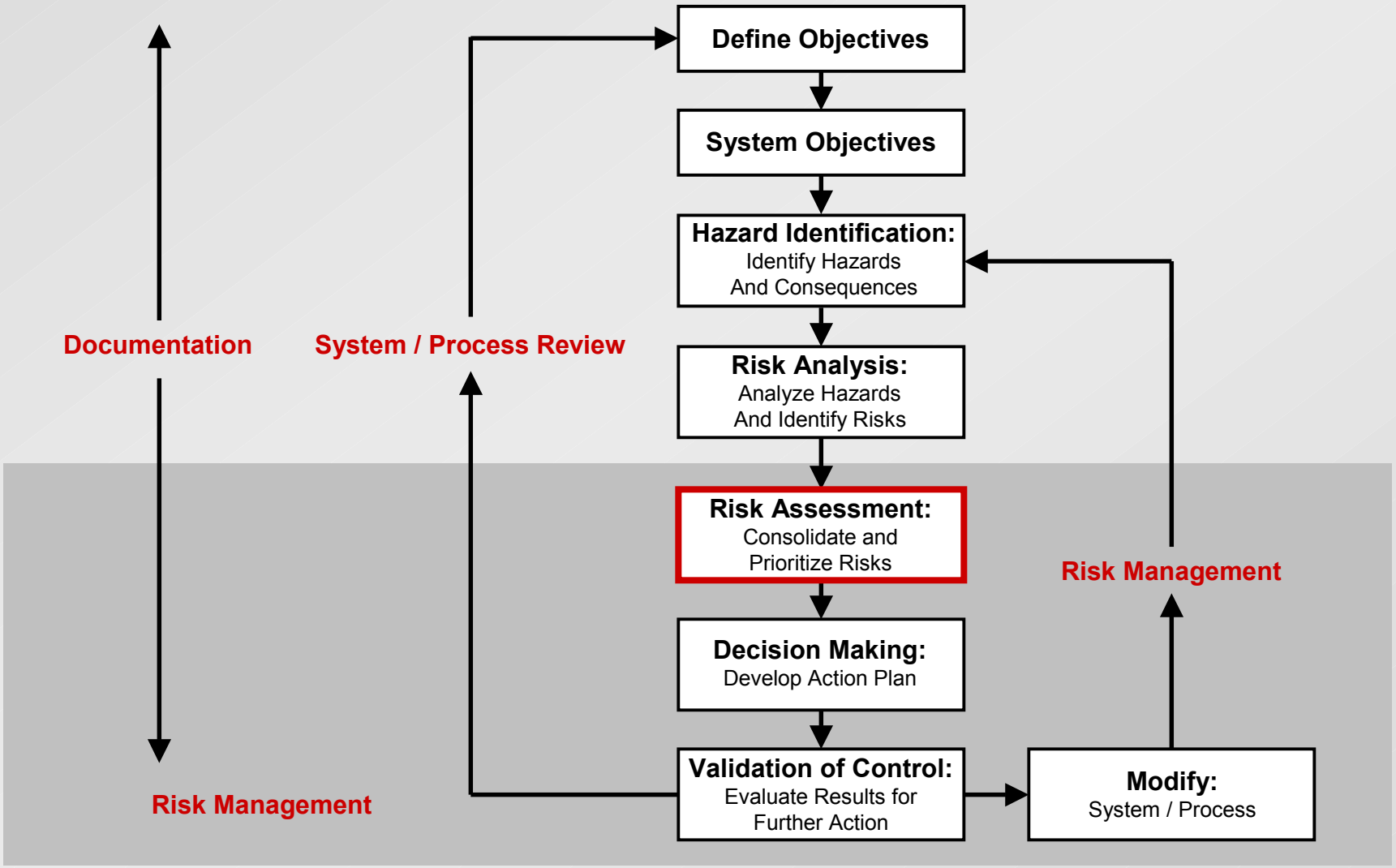
Engine Failure During Takeoff Risk Analysis

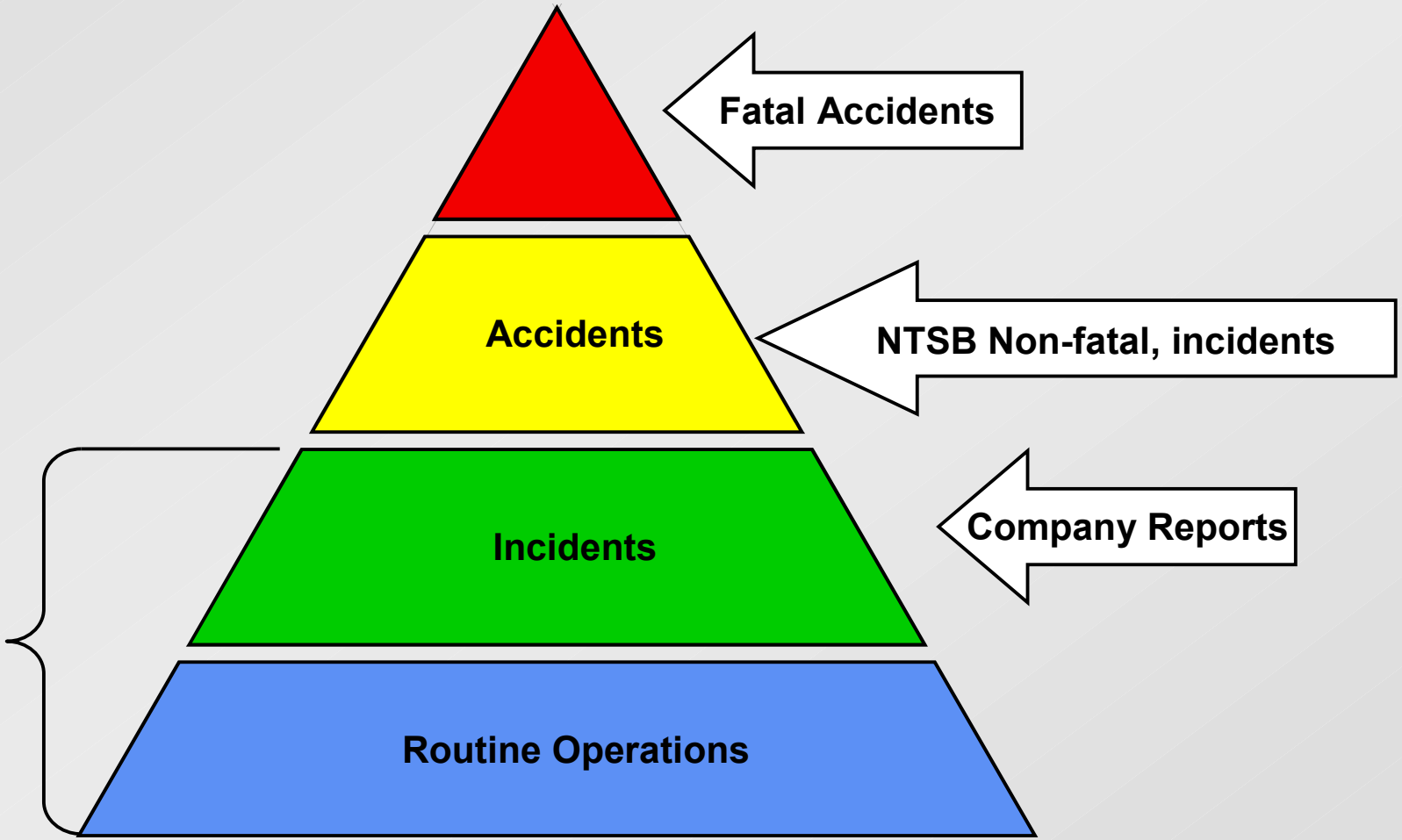


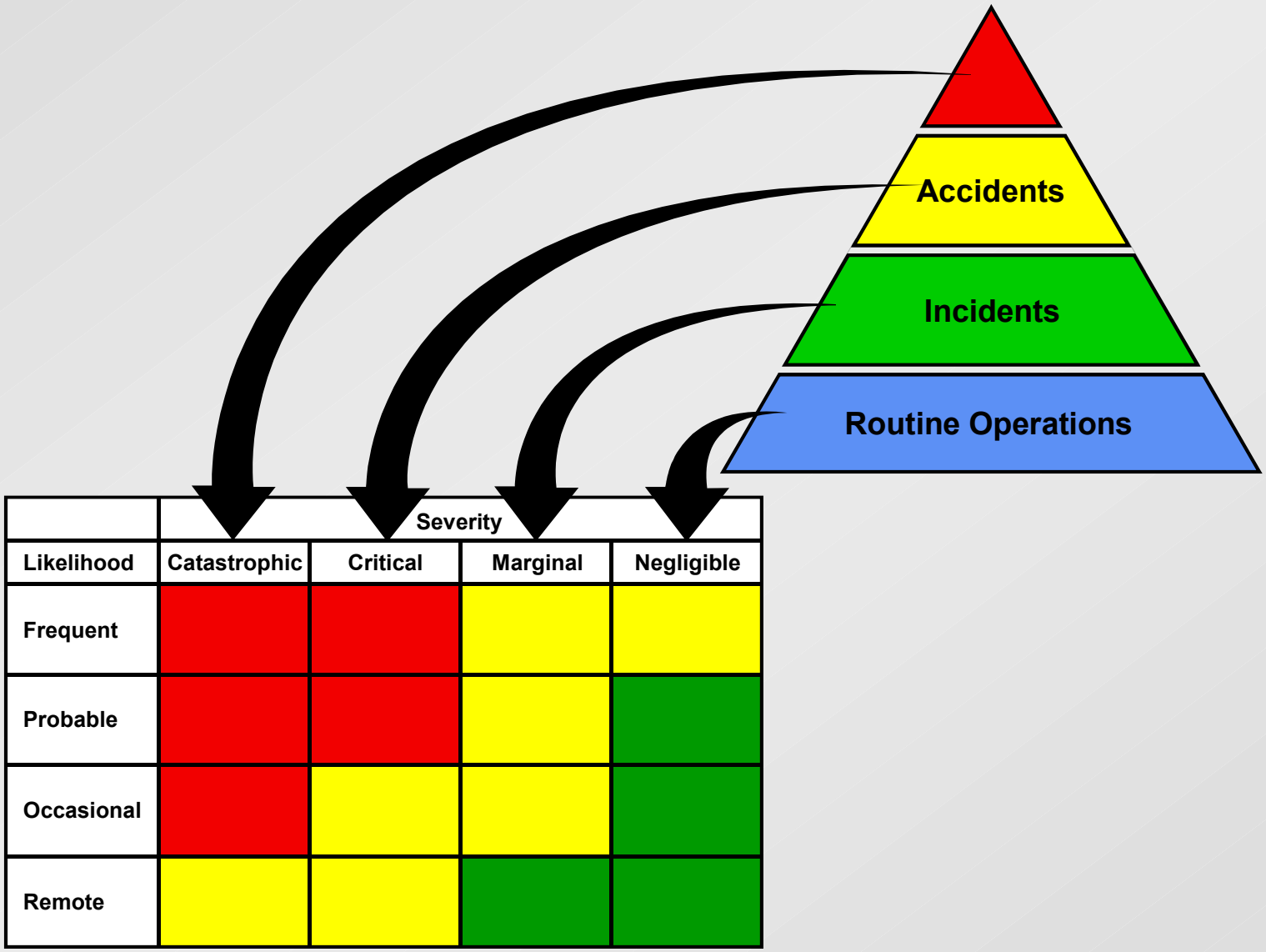
Engine Fail Risks

- Pilot thrust lever technique
- Pilot engine limit monitoring
- Pilot engine anti-ice, ignition, or air conditioning pack selections
- Pilot reduced thrust FMS entry errors
- Pilot decisions and actions following engine failure

FAA System Safety Process

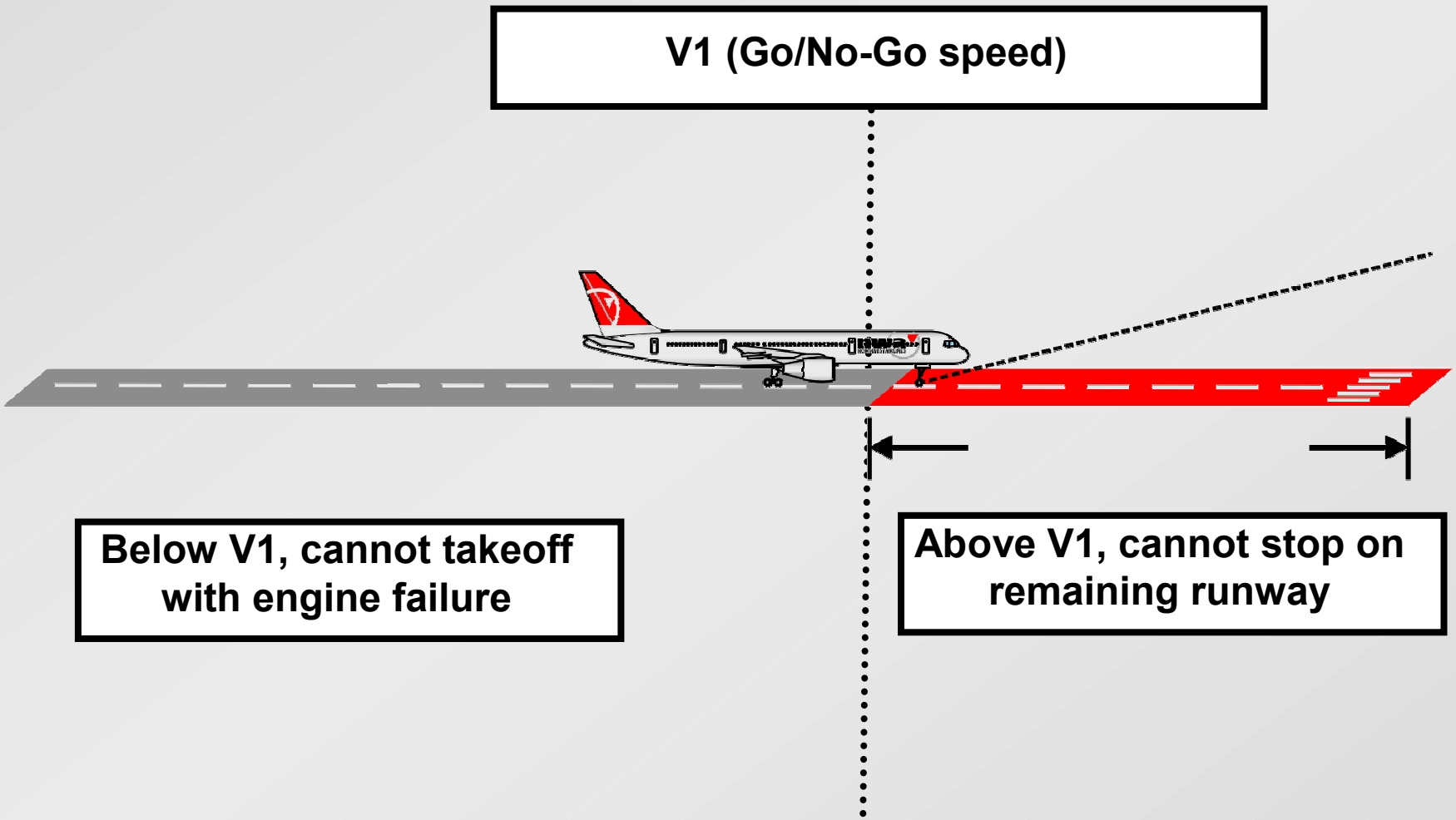



Fatal Accidents
Accidents
NTSB Non-fatal, incidents
Incidents
Company Reports
Routine Operations



	Severity			
Likelihood	Catastrophic	Critical	Marginal	Negligible
Frequent				
Probable				
Occasional				
Remote				

Balanced Field Engine Failure Planning



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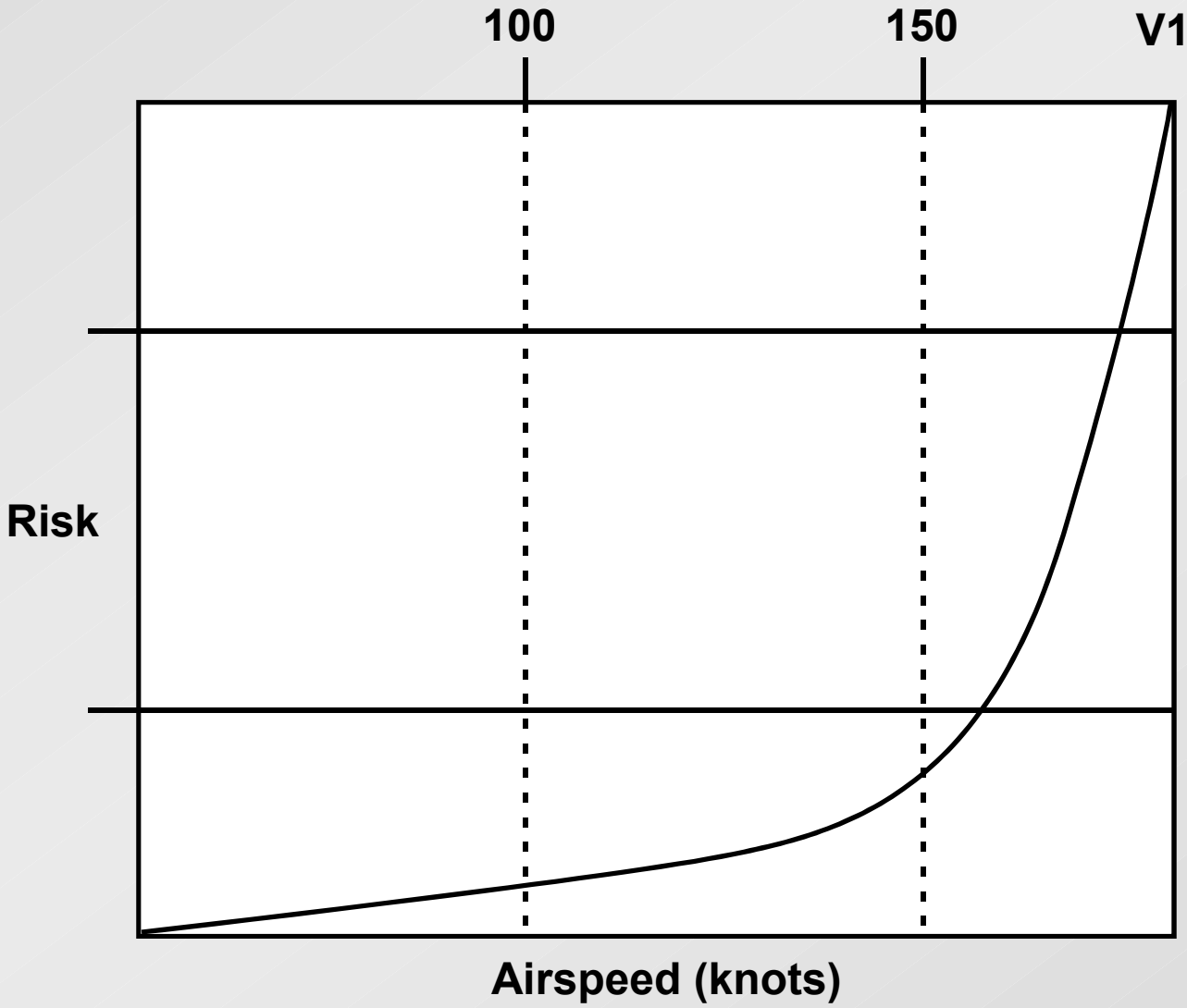

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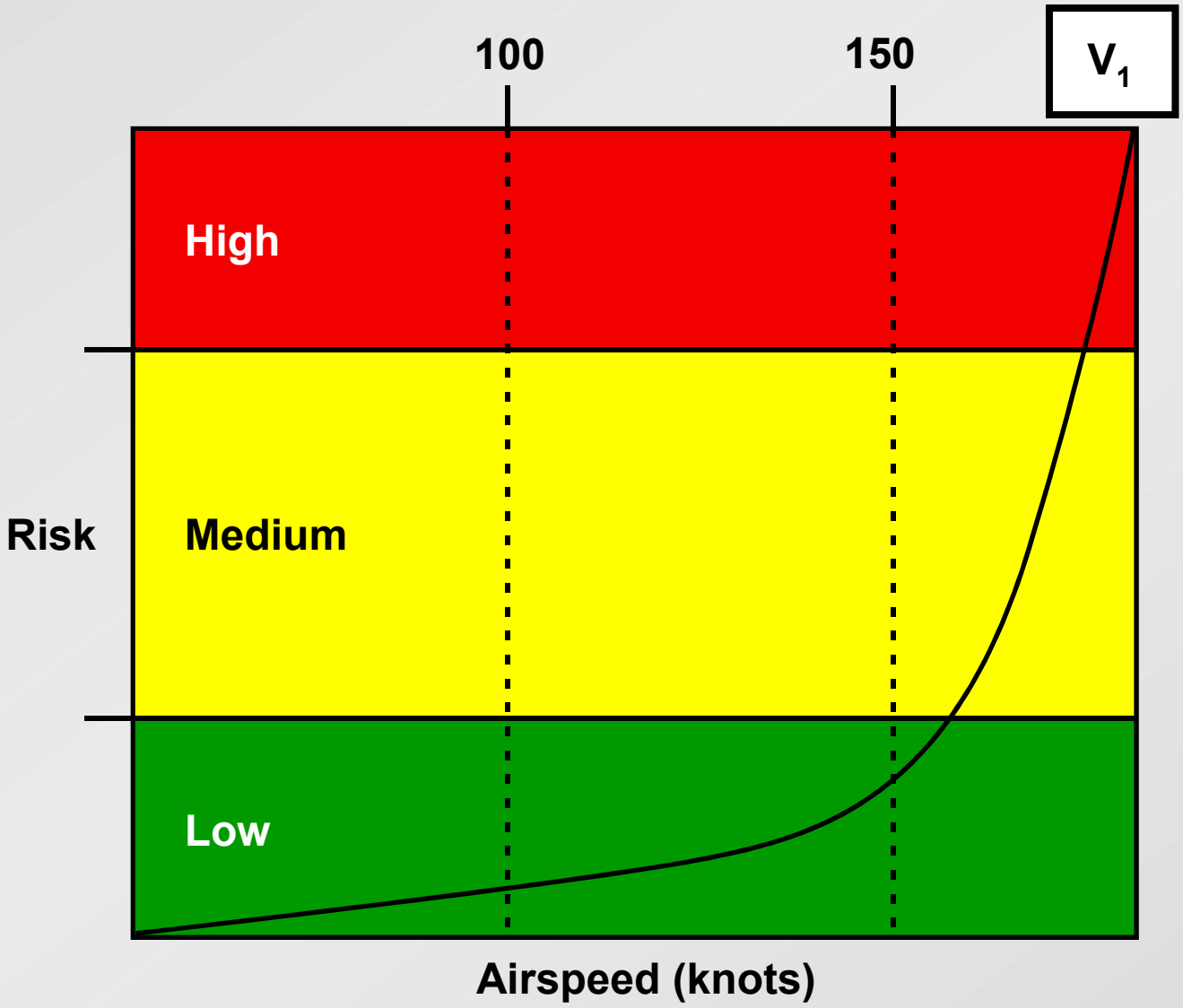
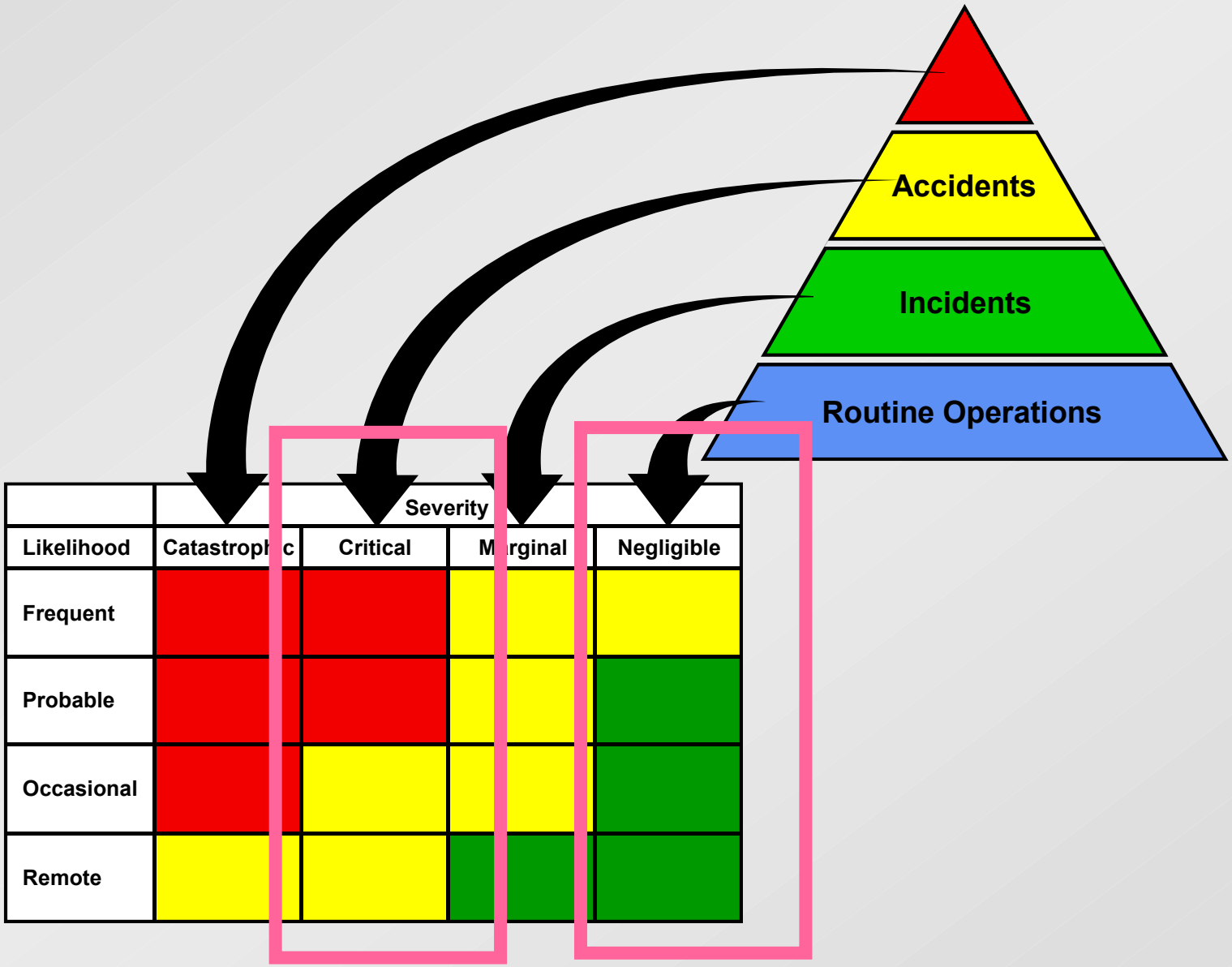


Risk Reduction Objective



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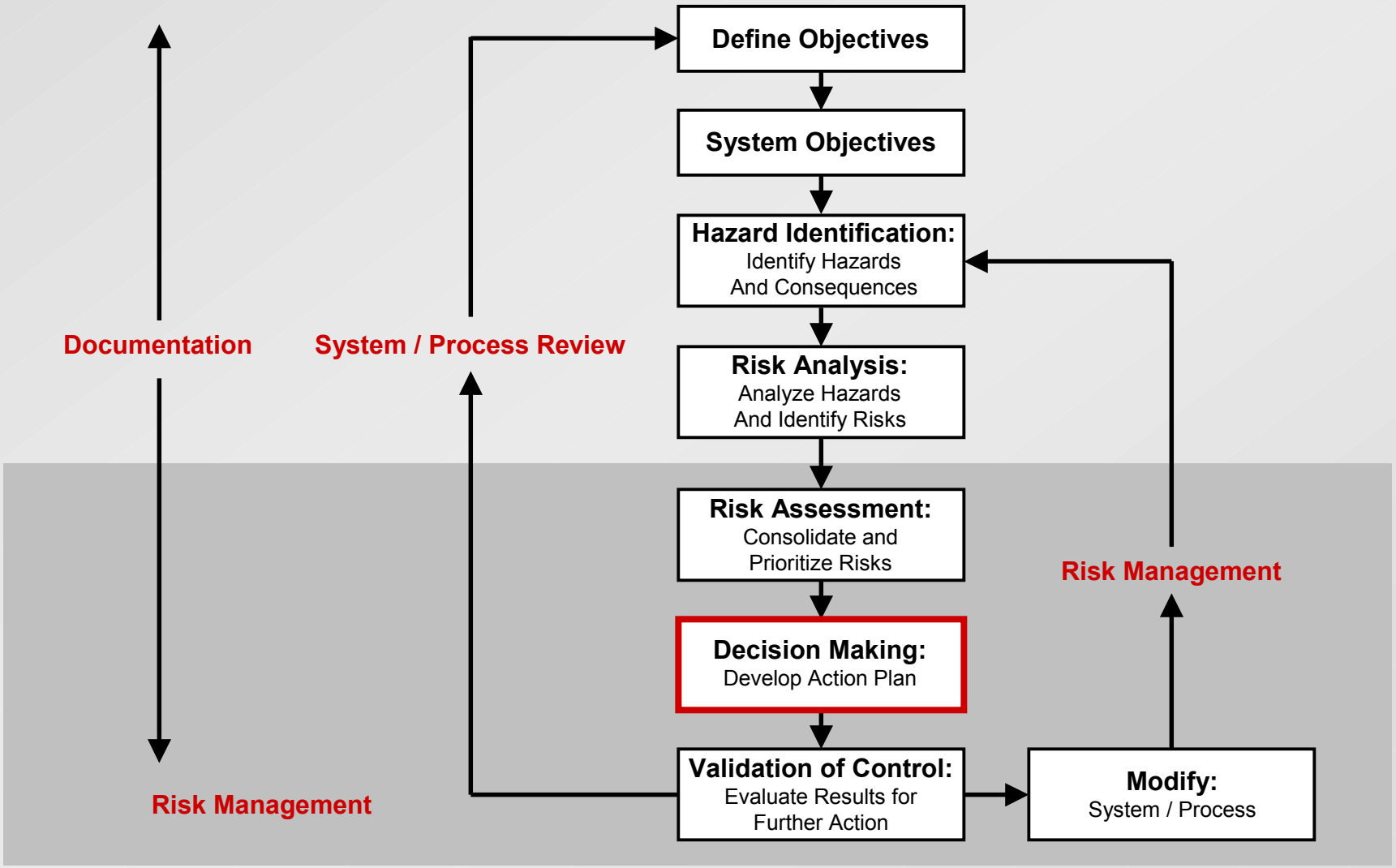

Objective:

- Eliminate hazards

or

- Minimize risks from hazards

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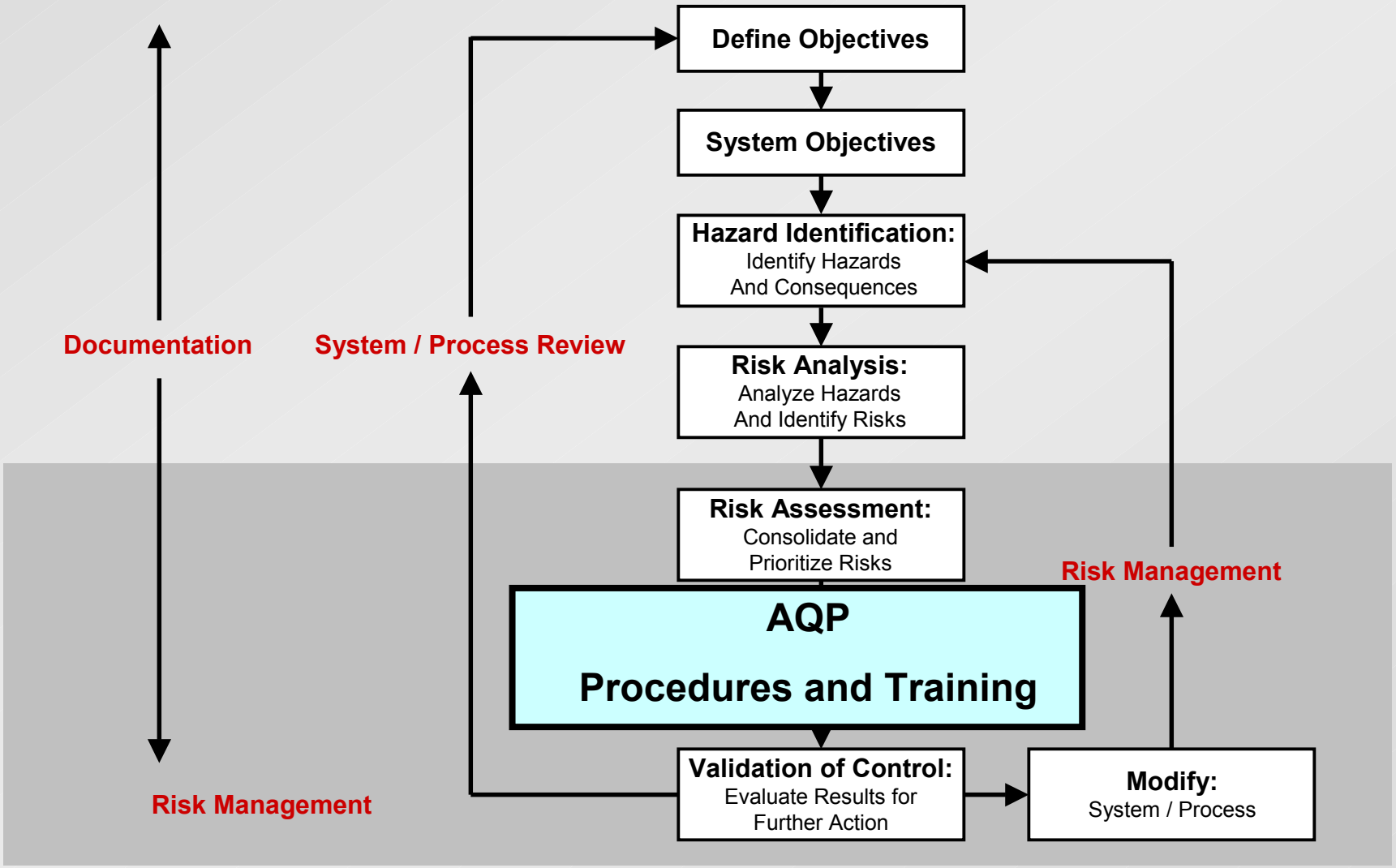

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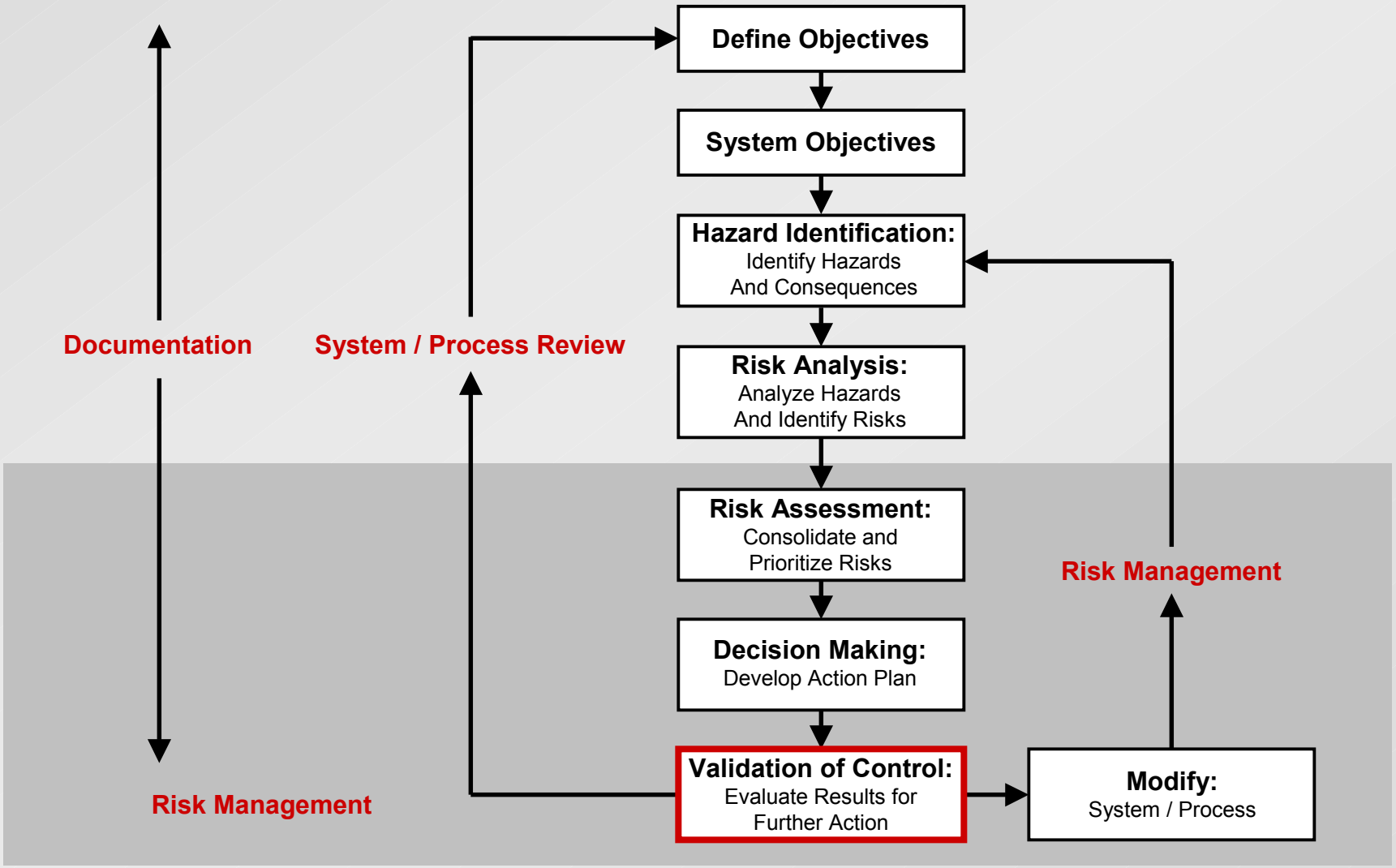
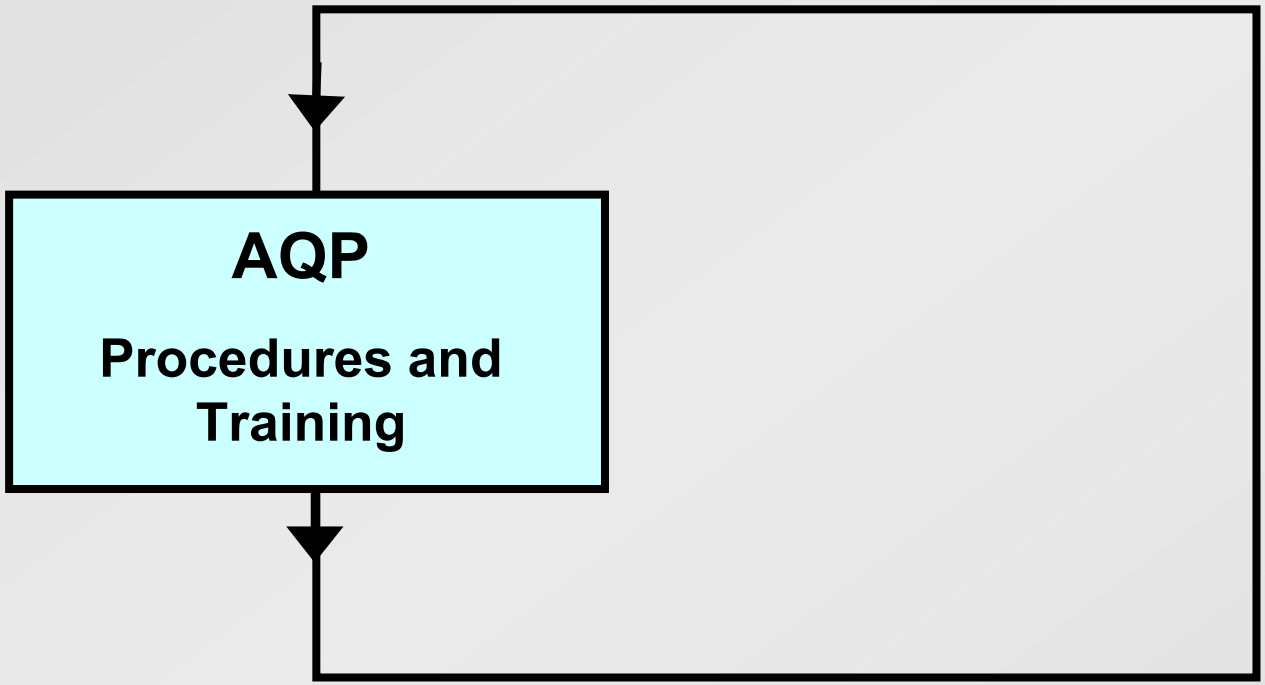


AQP: Train to Proficiency



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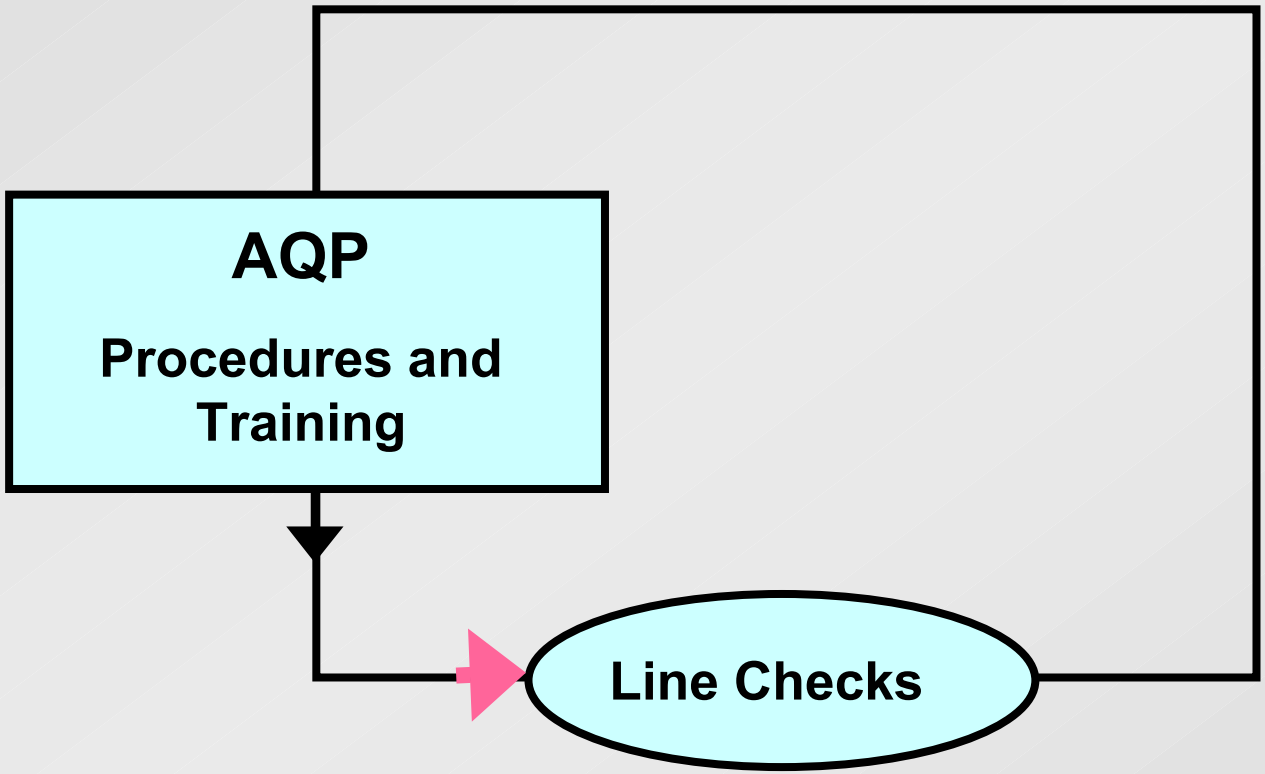

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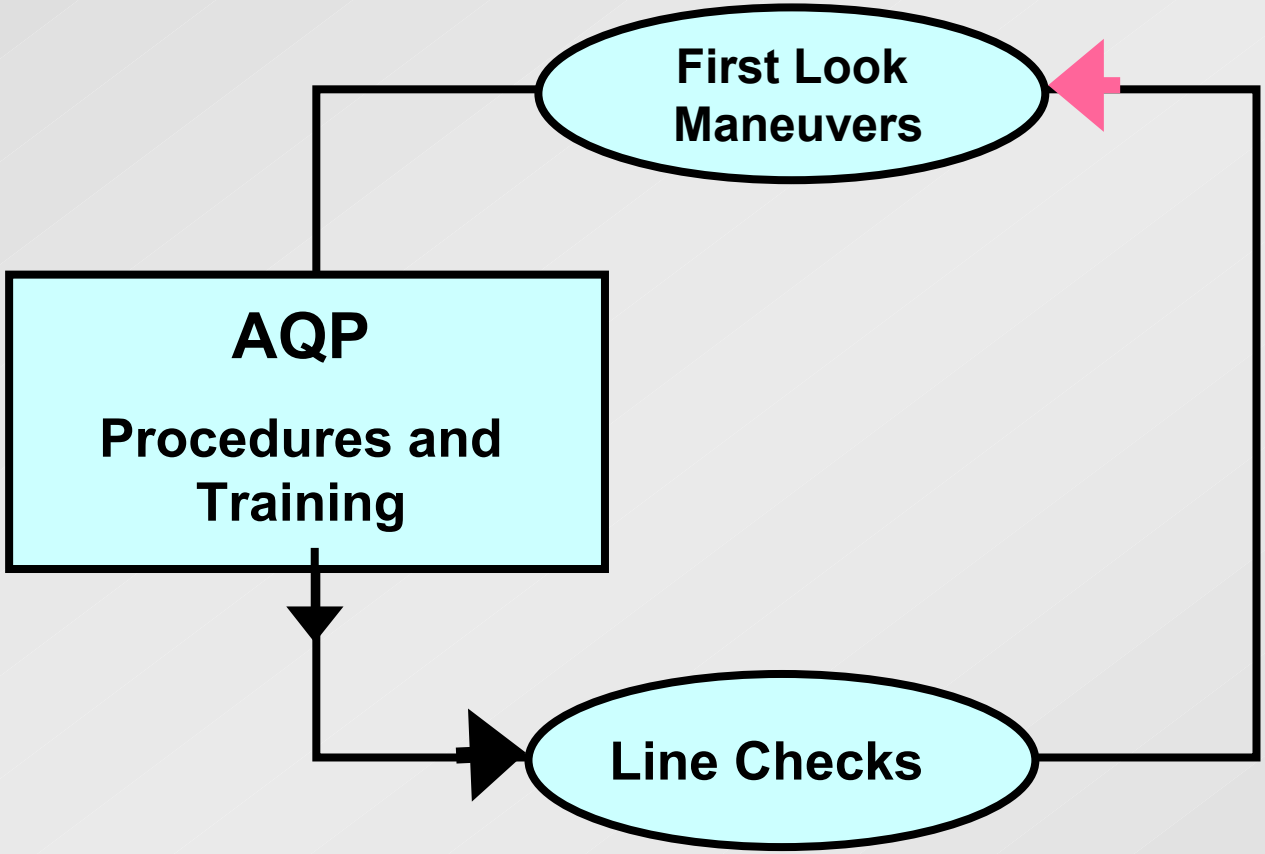
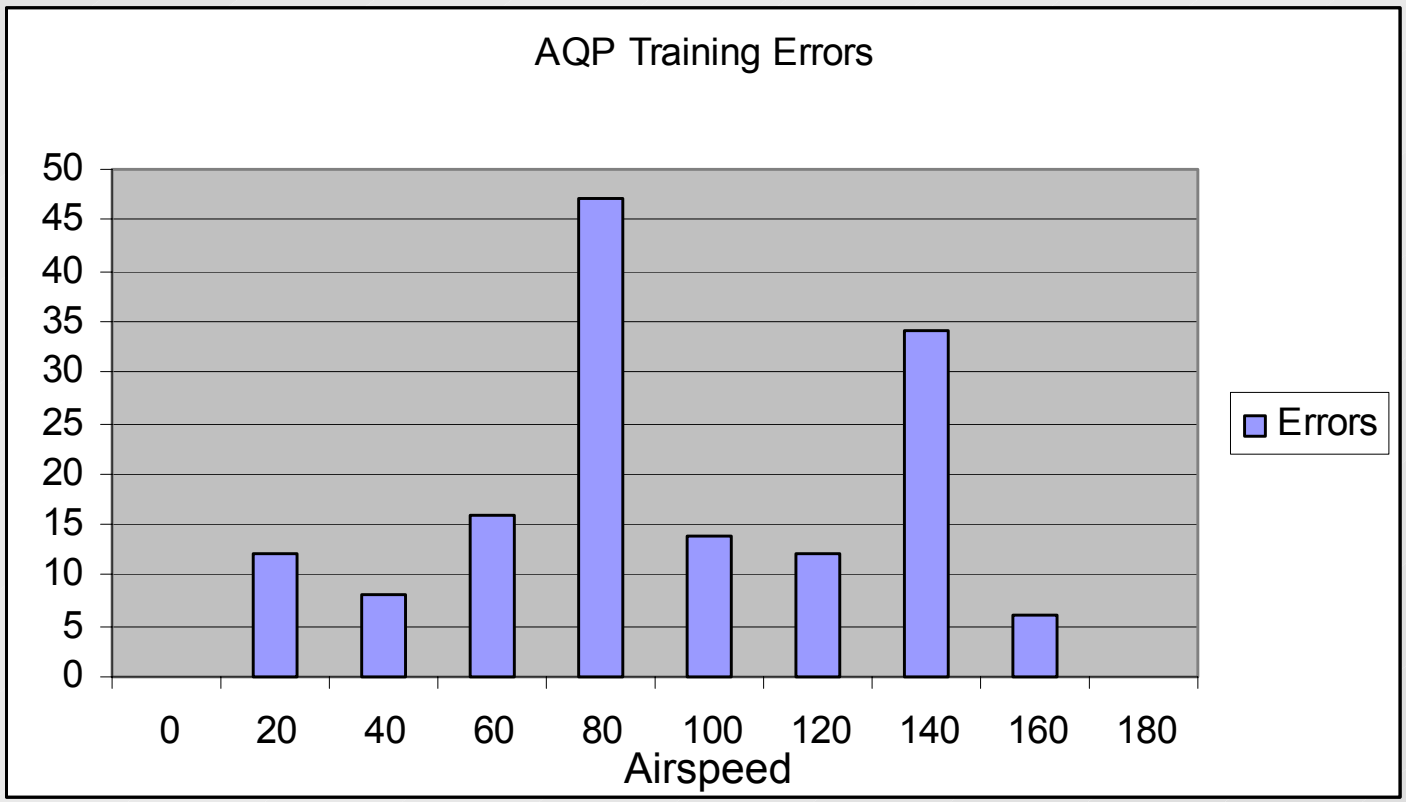


Action Plan to Reduce Risk

- Analyze engine failure data
- Develop AQP training plan
- Implement AQP “first look” at engine failure



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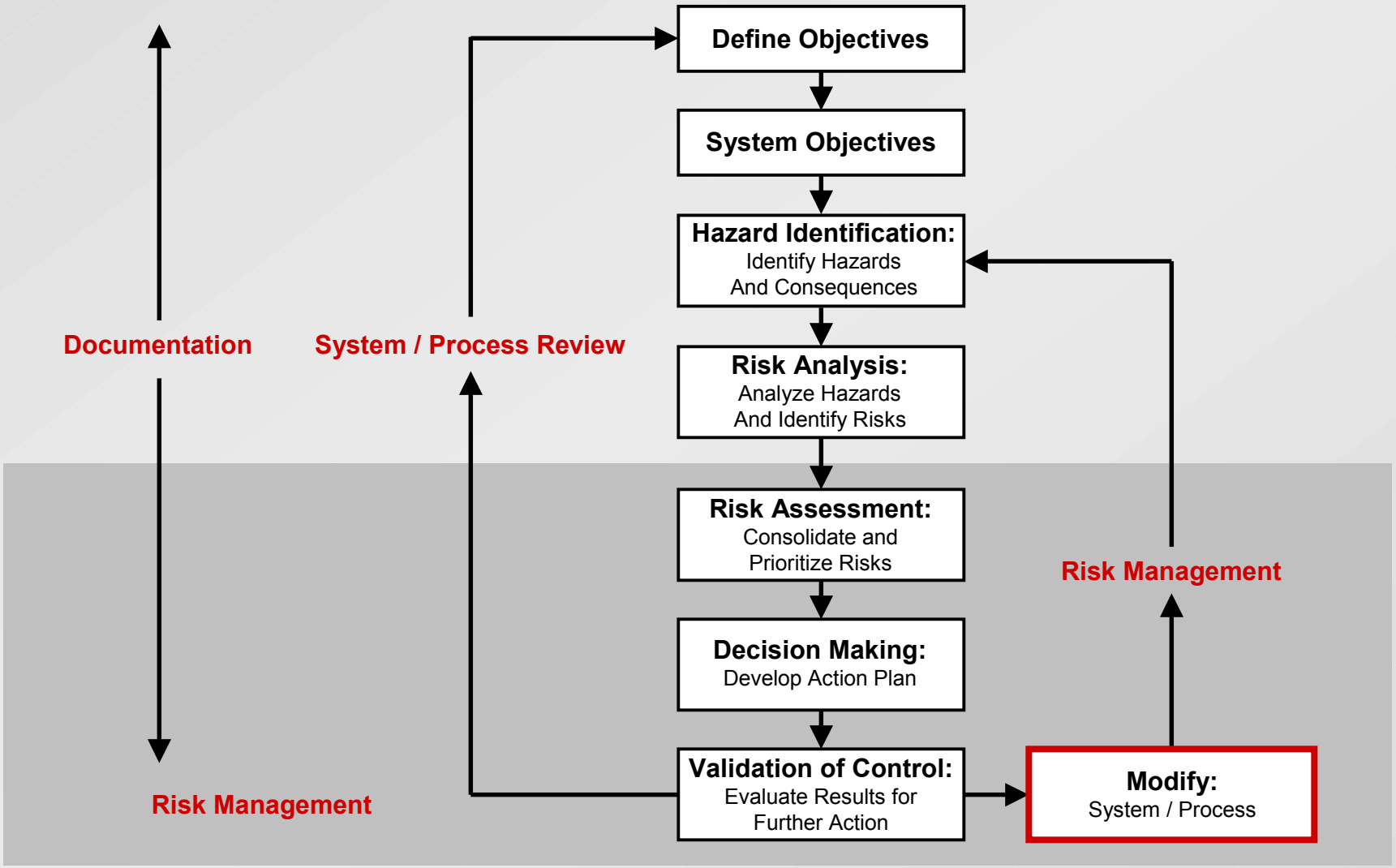
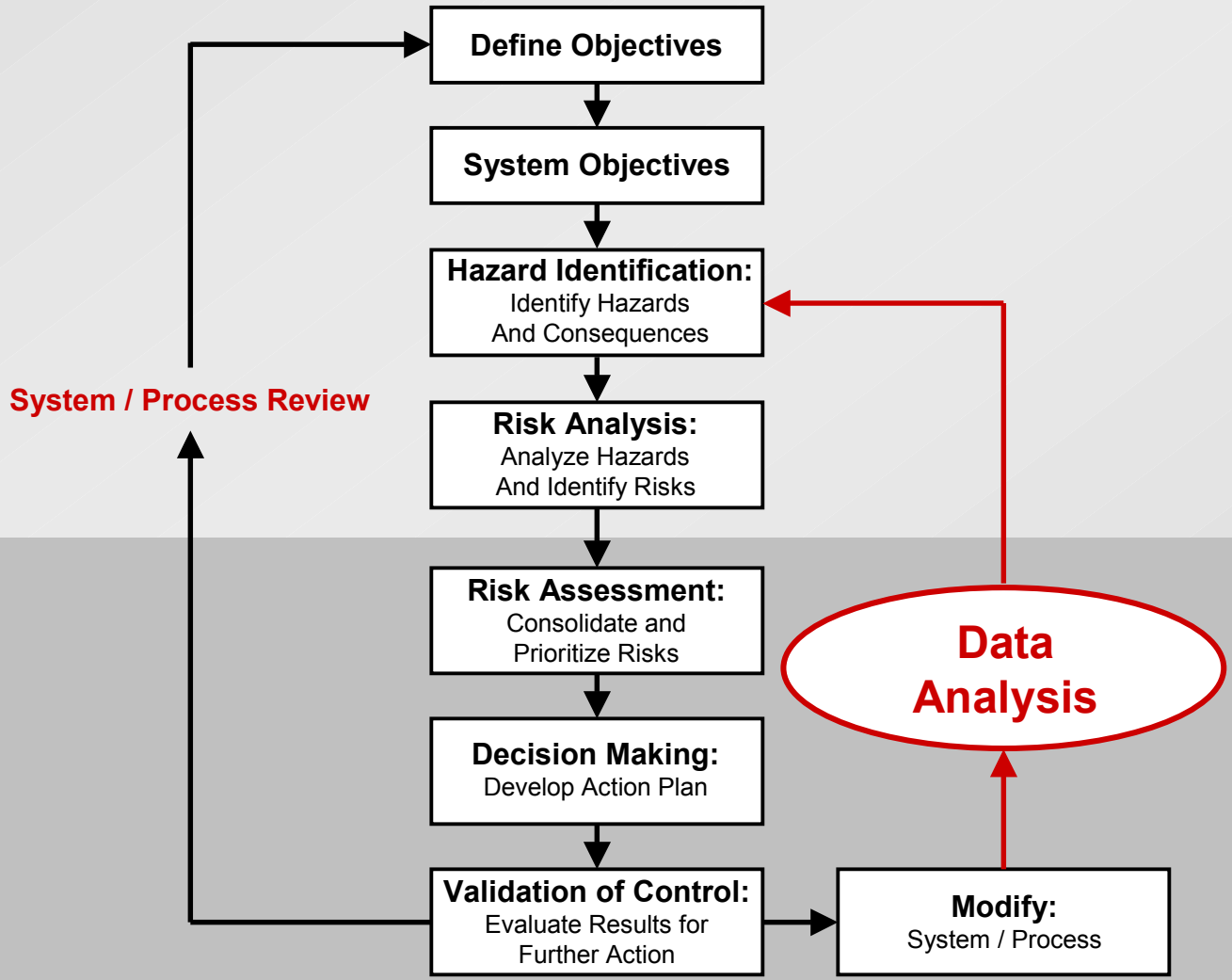


Control Process



Control Process

- No process without data
- No data without analysis
- Corrective actions to follow analysis

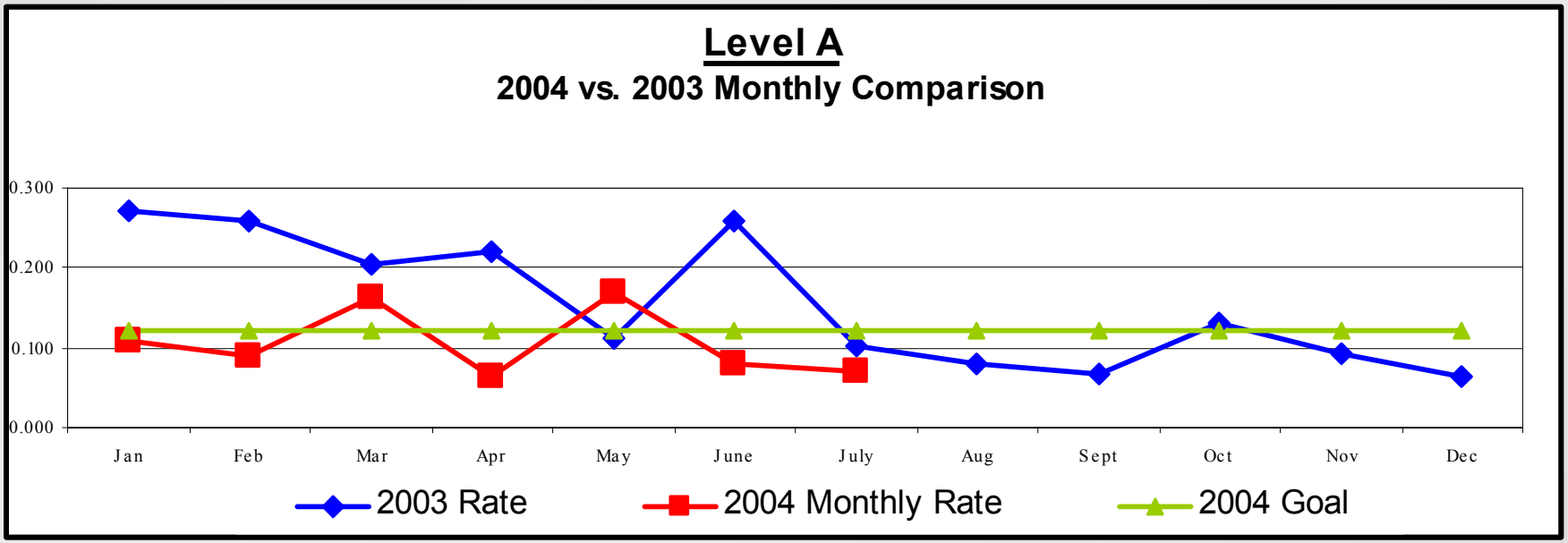
Trend Analysis *(data simulated)*

- Trending data by Year-Year and Year to date performance

		Month Only		Year-To-Date		
		July	July	2004	2004	YTD vs.
	2004	2004	2004	YTD	YTD	2004
Measurement	Goal	# of Inc.	Inc. Rate	# of Inc.	Inc. Rate	Goal (%)
LEVEL A **Total Incidents**	**0.120**	**7**	**0.140**	**34**	**0.103**	**14.2**
Navigation Errors	**0.011**	1	0.020	6	0.018	(65.2)
Altitude Deviations	**0.009**	1	0.020	4	0.012	(34.6)
Procedural Errors	**0.005**	0	0.000	2	0.006	(21.2)
Aircraft ground damage	**0.005**	0	0.000	3	0.009	(4.7)
Runway incursion	**0.002**	0	0.000	0	0.000	100.0
Runway/taxiway excursion	**0.010**	1	0.020	3	0.009	9.1
Aborted takeoffs	**0.026**	1	0.020	7	0.021	18.4
Turbulence encounters	**0.005**	0	0.000	1	0.003	39.4
Windshear	**0.044**	3	0.060	8	0.024	44.9

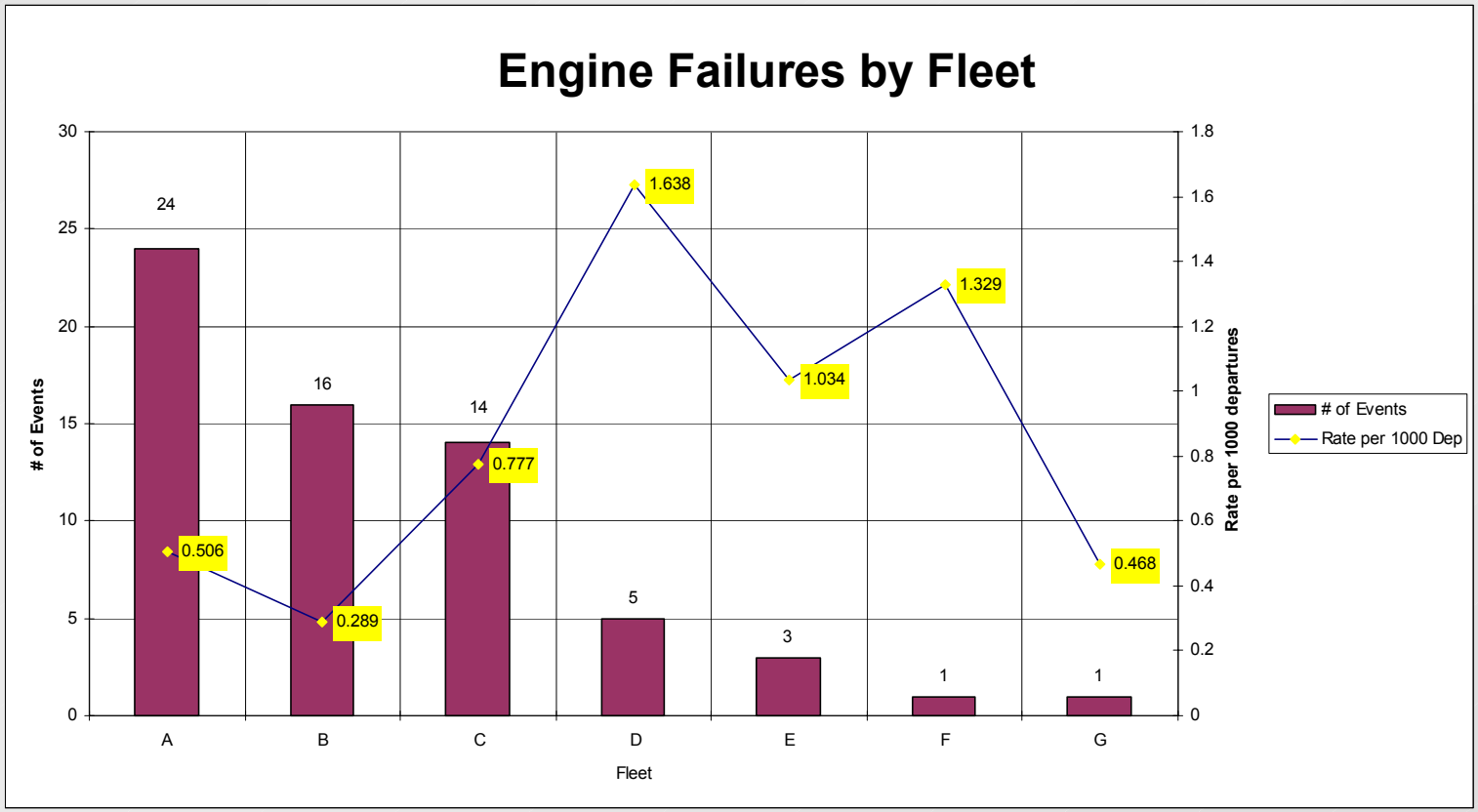
Trend Analysis *(data simulated)*

- Level “A” events collated for fleet wide trending
- Allows system wide trending and Y-Y comparison

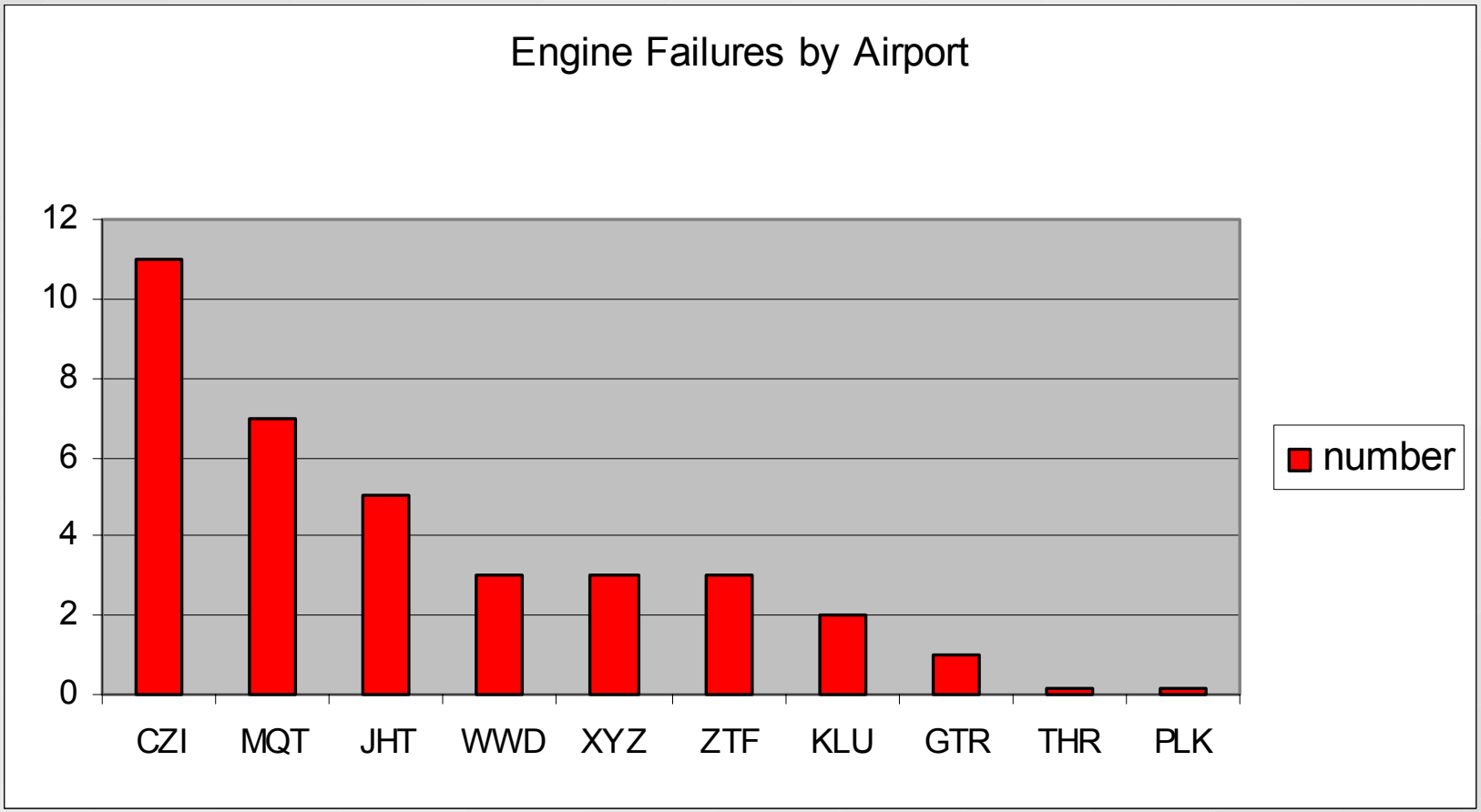


ASAP Data
Takeoff Engine Failure Data by Fleet
(data simulated)

- Fleet breakdown, raw count versus rate/1000
- Normalization of data identifies high risk areas



Simulated FOQA Data



all data is simulated

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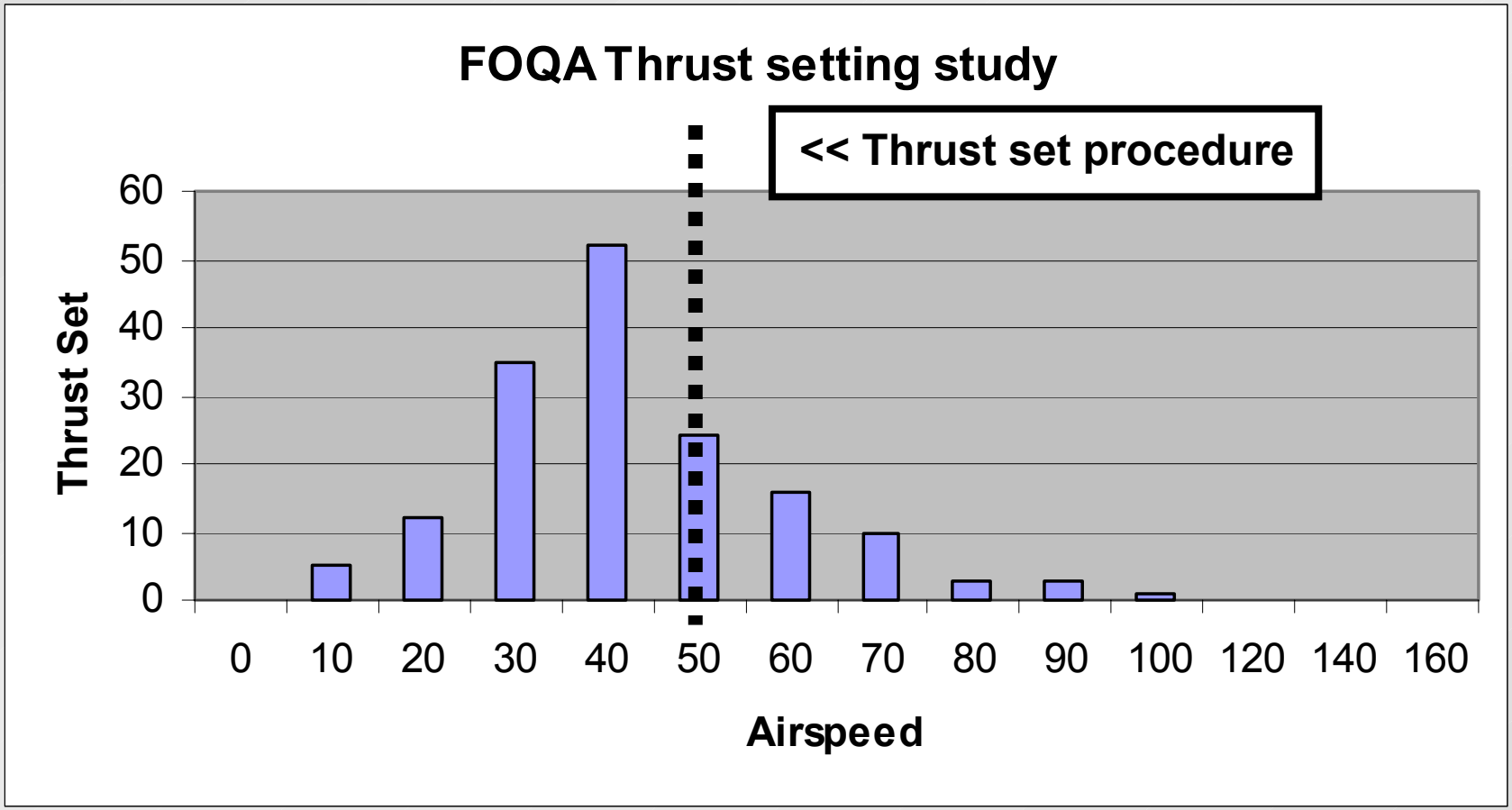

all data is simulated

Determine Level of Organization or Department that Manages Risk

- Technical Operations
  - Eliminate hazard thru maintenance protocols
- Flight Operations
  - Minimize risk thru training
  - Eliminate hazards thru procedures
- System Operations
  - Eliminate hazards by restricting operations
  - Eliminate hazards by controlling operational environment
  - Minimize risk by increasing operational margin

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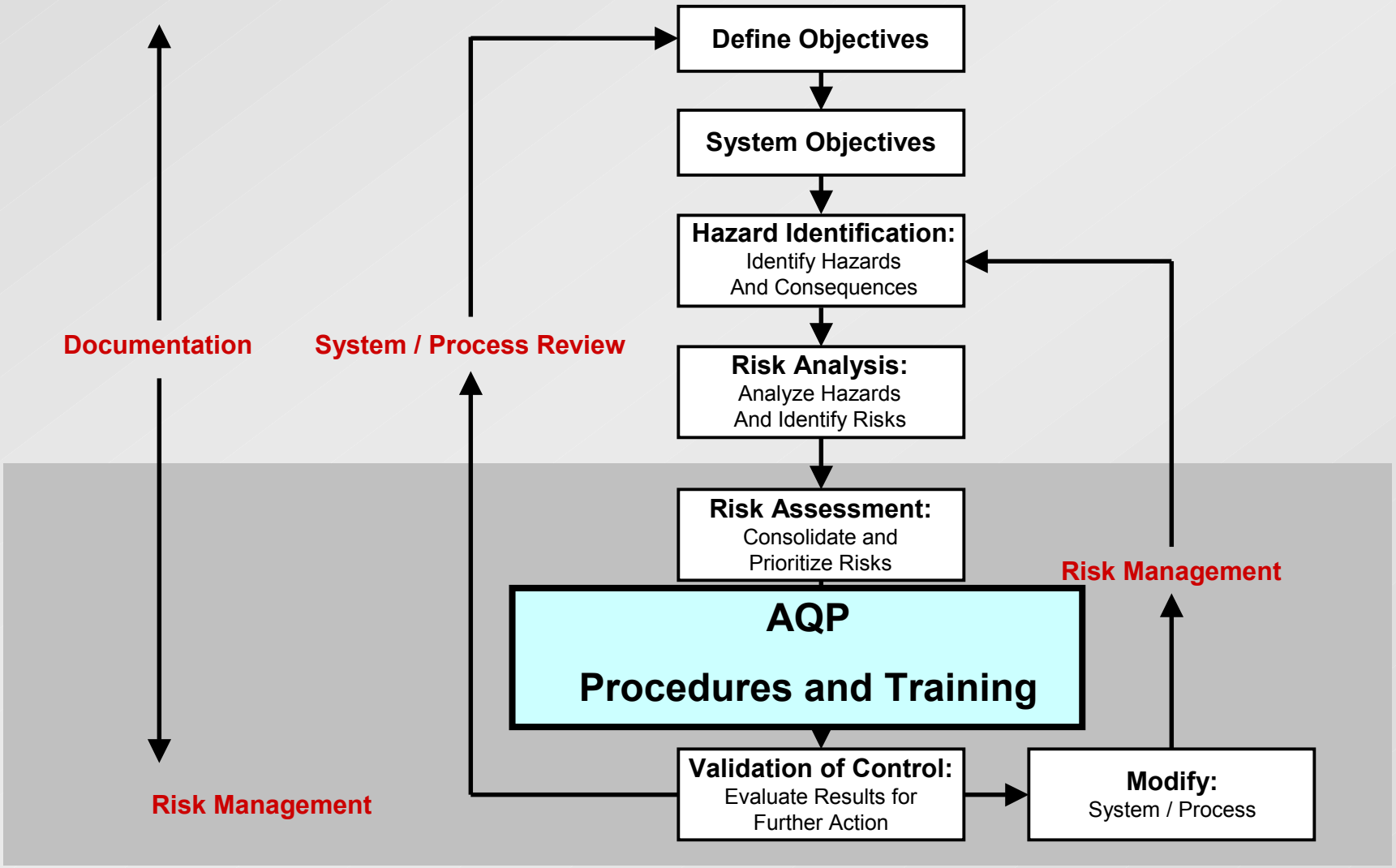

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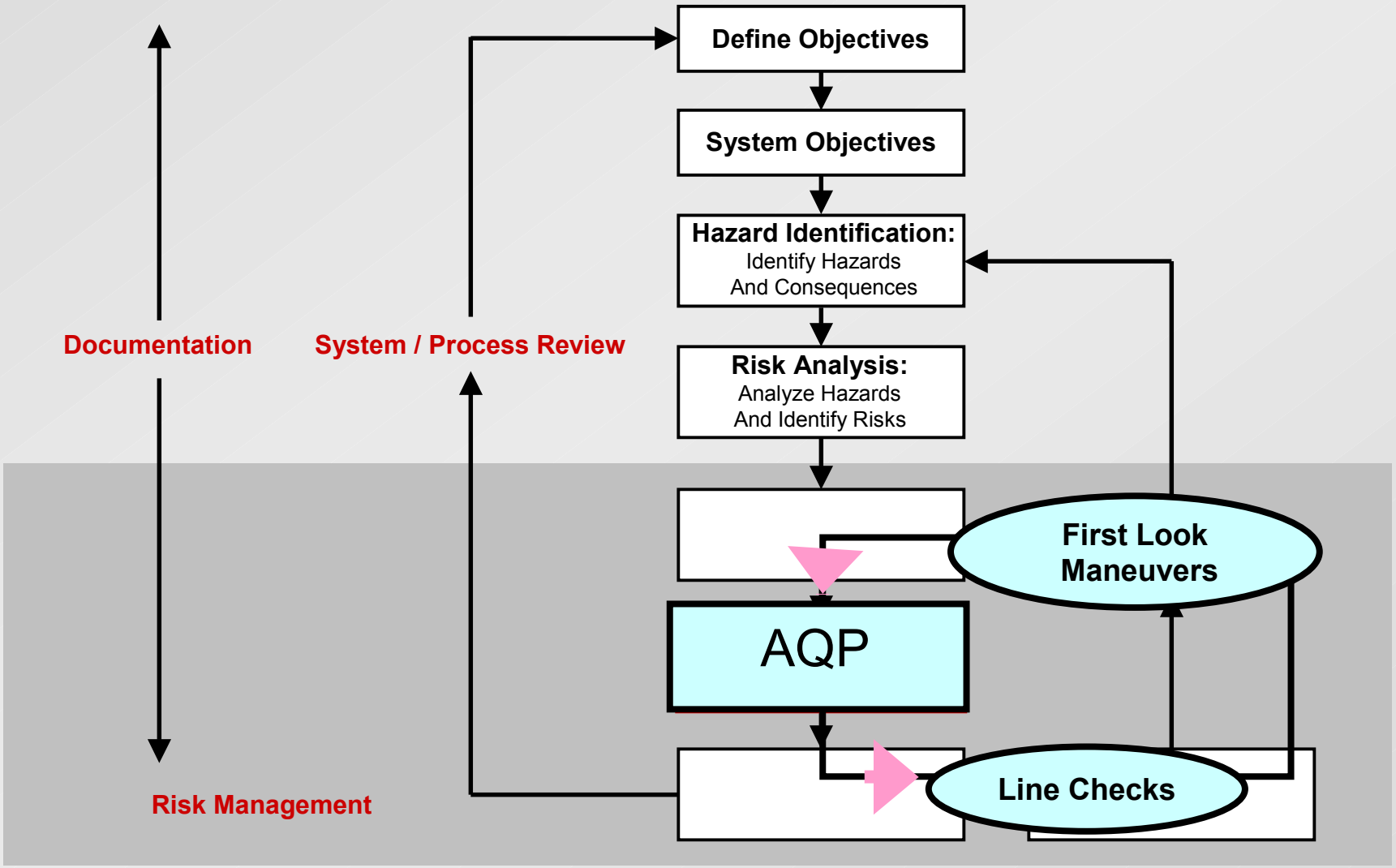

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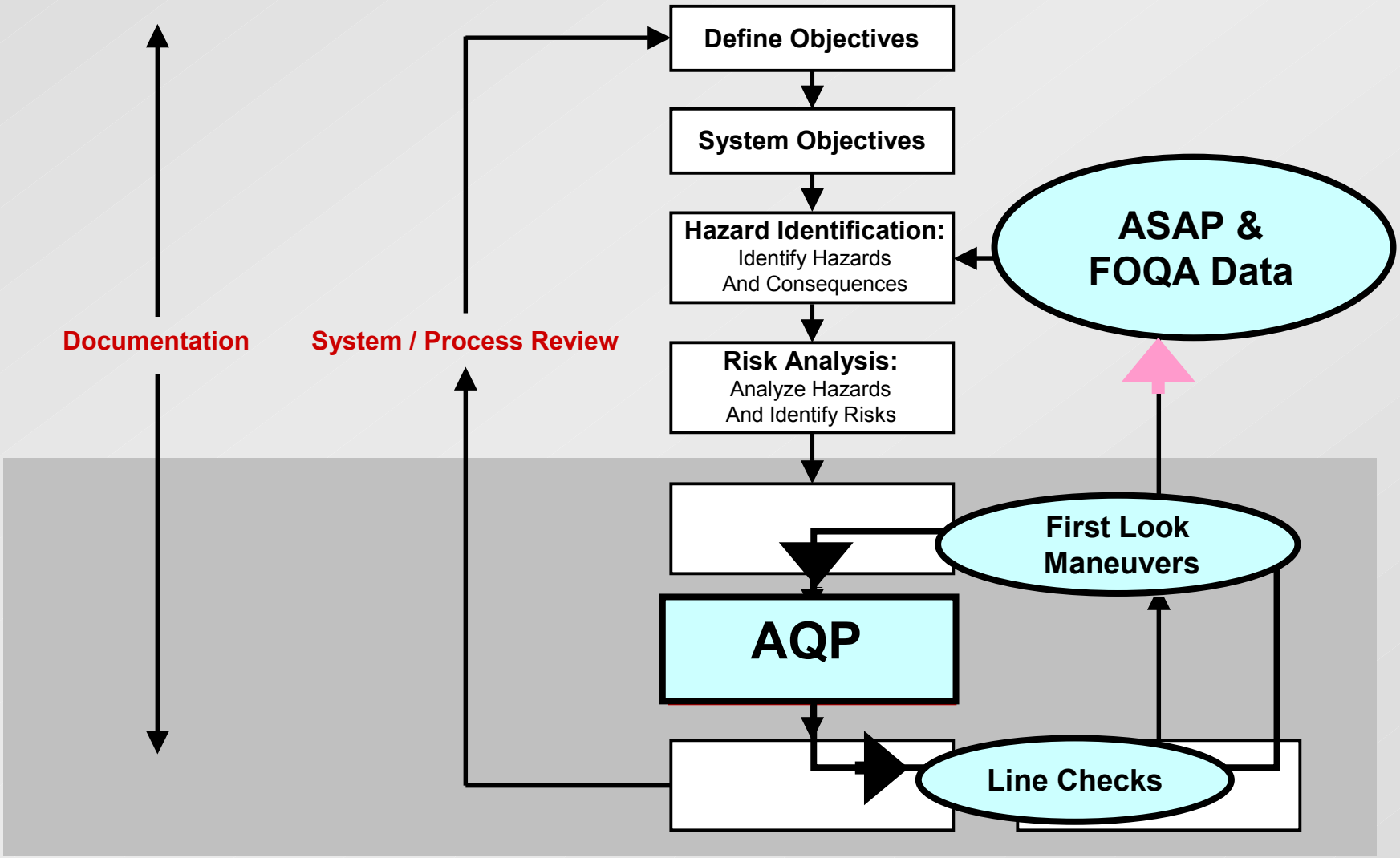

Summary

The integration of the FAA's System Safety Process and the three voluntary safety programs (ASAP, FOQA, and AQP) allows airlines to monitor their flight operations and develop strategies to constantly reduce the number and severity of operational incidents.

Questions?